**U.S. DEPARTMENT OF COMMERCE**
**National Technical Information Service**

PB-245 575

# AWARDS REGISTER GRANTS ASSISTANCE PROGRAMS

## VOLUME I. LISTING AWARDS DURING THE 2ND HALF OF FY 1975, EXCEPT STATE AND LOCAL ASSISTANCE AWARDS

ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 1975

EPA-GAD/1-75-003

PB 245 575

# AWARDS REGISTER GRANTS ASSISTANCE PROGRAMS

## Volume I

Listing Awards During the 2nd Half of FY 1975
Except State and Local Assistance Awards

U.S. ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

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| **BIBLIOGRAPHIC DATA SHEET** | 1. Report No.<br>EPA-GAD/1-75-003 | 2. | 3. Recipient's Accession No.<br>PB-245-575 |

4. Title and Subtitle

Awards Listing Grants Assistance Programs of EPA 2nd Half FY '75; Vol. I; Except State and Local Assistance Awards

5. Report Date
September 1975

6.

7. Author(s)

Grants Information Services Section

8. Performing Organization Rept. No.

9. Performing Organization Name and Address

Grants Administration Division
Office of Administration
U. S. Environmental Protection Agency
Washington, D. C. 20460

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

same as item 9

13. Type of Report & Period Covered
2nd half of FY 175

14.

15. Supplementary Notes

This is an addition to the series of Awards Listings

16. Abstracts

This publication lists all the second Half of Fiscal Year 1975 Grants Awards by the United States Environmental Protection Agency except State and Local Assistance awards

The format of the publication is to have the initial sort by states, then by the various grant programs then awards to grantees in the State. Each entry consist of the identification of the grantee, the program area - for example water or air, the project title, grant number, award date, and dollar amount.

Section II of the volume contains a 250 word description of most research and demonstration projects.

17. Key Words and Document Analysis. 17a. Descriptors

Awards
Grants
Air
Hazardous Material
Pesticides
Radiation
Solid Waste
EPA
Water
Water Supply
Training
Fellowships
Research
Demonstration

17b. Identifiers/Open-Ended Terms

EPA Wards for the Headquarters grants in Research, Demonstration, Training and Fellowships.

17c. COSATI Field/Group

**PRICES SUBJECT TO CHANGE**

| | | |
|---|---|---|
| 18. Availability Statement | 19. Security Class (This Report)<br>UNCLASSIFIED | 21. No. of Pages |
| | 20. Security Class (This Page<br>UNCLASSIFIED | |

FORM NTIS-35 (REV. 10-73) ENDORSED BY ANSI AND UNESCO. THIS FORM MAY BE REPRODUCED USCOMM-DC 8265-P74

# PREFACE

This "Awards Listing" consists of two volumes. Volume I lists all grants awards except State and local assistance awards which includes Wastewater Treatment Construction grants. Volume II list only State and local assistance awards.

Volume I consists of two sections. Section one is the awards listing with the first sort by States, then media such as air, water, pesticide, etc. Section two is organized on the basis of grant numbers, in ascending order. Following the grant number there is a brief description of project to be performed. This description was prepared by the grantees and contains approximately 250 words.

Section II narrative compilation has not been previously published by the Environmental Protection Agency since the information was supplied to, and available by purchase from, the Smithsonian Scientific Information Exchange (SSIE) on a select program area basis. Information received from users of previous issues of this Awards Register mandated that a short description of all research and demonstration projects be included. Including this project description would allow an analysis of the technical areas of EPA support.

The Grants Operations Branch provided us with the descriptive material. The availability of two additional people this summer, in the Grants Information Services Section allowed us to complete this task. Miss Ellen O'Boyle and Judy Colantuoni must be signalled out for their assistance in organizing and editing this material.

Not all awards have a description and there may be other errors, but due to the desire on our part to publish as soon as possible after the close of the fiscal year, we decided to follow this course of action rather than delaying the publication for further refinement. Any comments or criticisms should be mailed or phoned to Grants Information Services Section (202) 755-2830.

Grants Administration Division
8/22/75

## SOURCES OF INFORMATION ON EPA GRANTS AWARDED, REPORTS GENERATED BY GRANTS AND OTHER GRANTS-RELATED MATERIALS

### PUBLICATIONS-AWARDS AND ADMINISTRATION

### Semi Annual Award Listing, Grants Assistance Programs of EPA; Awards During 1st Half of Fiscal Year 1975

Volume I Lists all awards in research, demonstration, training and fellowship

Environmental Protection Agency, EPA-GAD/1-75-001
available from NTIS, publication no. PB 241 476
$4.25 paper, $2.25 microfiche.

Volume II Lists all State and Local Assistance Awards

Environmental Protection Agency, EPA-GAD/1-75-002
available from NTIS, publication no. PB 241 400/
as $7.00 paper, $2,25 microfiche.

### Awards Register-Grants Assistance Programs-Showing Projects Awarded in Fiscal Year 1974

Volume I Lists all awards in Fiscal Year 1974
Except Waste Water Treatment Construction
and Waste Water Treatment Reimbursement
Awards. Contains 168 pages

NTIS order no. PB 238 370/AS
• $6.25 paper copy and $2.25 microfiche

Volume II Lists only Waste Water Treatment Construction
Awards in Fiscal Year 1974

NTIS order no. PB 238 371/AS
$7.25 paper copy and $2.25 microfiche

Lists only Waste Water Treatment Reimbursement
Awards in Fiscal Year 1974

NTIS order no PB 238 372/AS
$7.00 paper copy and $2.25 microfiche

Awards Register-Grants Assistance Program-Showing Projects
Awarded in Fiscal Year 1973, EPA 220/
1-73-004, NTIS order no. PB 229 827/AS
$10.00 paper copy, $1.45 microfiche

The format of the above publications has the initial sort by States. Each entry includes grantee identification, program area (such as water, air) grant title, grant number, award date and dollar amount.

The public can purchase the above from the:

National Technical Information Service (NTIS)
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22151
(703) 321-8507

## THE AWARDS REGISTER, GRANTS ASSISTANCE PROGRAMS (EPA) SHOWING PROJECTS AWARDED IN FISCAL YEAR 1972

This publication can be purchased from the Superintendent of Documents, U. S. Government Printing Office (GPO), Washington, D. C. 20402. This document can be ordered for $3.70 by mail delivery and $3.25 if picked up at GPO. When ordering, specify Stock Number 5500-00084. For materials ordered from the Government Printing Office, address request and make checks payable to: Superintendent of Documents, U. S. Government Printing Office.

## THE ENVIRONMENTAL PROTECTION AGENCY (EPA) GRANTS ADMINISTRATION MANUAL

This manual sold on subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20406, consists of the basic manual and supplements at a cost of $18.00. To purchase the manual and supplements, subscribe to EPA, 8/2 EPA Grants Administration Manual. All correspondence concerning this publication should be addressed to GPO.

## WASTE WATER TREATMENT CONSTRUCTION DATA BASE

Awards for the waste water treatment facilities construction grants under Public Law 92-500 made during a particular month are listed in a monthly publication entitled "Waste Water Treatment Construction Data Base - Public Law 92-500 Project Records". This publication is prepared by the Grants Administration Division and distributed and sold by the National Technical Information Services.

The March 1974 issue (PB 23130 provides a base listing of all grants awarded under Public Law 92-500. Beginning with the April 1974 issue (PB 231300-01) the listings will contain awards for one month only and will be numbered in sequence. Microfiche (24x) of each copy is also available. The subscription price is $100.00 annually starting January 1, 1975. Previous issues can be purchased at $25.00 a copy.

The publication is distributed to subscribers approximately five weeks after the close of the awards-listed month. It may be obtained through:

National Technical Information Services
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22151

NOTE: All of the preceding publications are available for examination at the Grants Office and Library of EPA headquarters and each Regional Office.

## Project Priority List

The State Project Priority List by the Environmental Protection Agency regions has been published and is available through NTIS. Order no. PB 241-528, price $10.00 paper, $2.25 microfiche.

The list contains wastewater construction projects by priority as assigned by the States. Each entry includes project number, applicant name, eligible cost, total project cost, grant step, initial contract award date and priority number.

NTIS - National Technical Information Services
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22151
(703) 321-8507 Mrs. Hays

## "FEDERAL ASSISTANCE PROGRAMS OF THE ENVIRONMENTAL PROTECTION AGENCY"

This publication includes descriptive information about Environmental Protection Agency (EPA) assistance programs reprinted from the Catalog of Federal Domestic Assistance, which was prepared for the Office of Management and Budget. Similar information on programs of all Federal agencies is included in the Catalog which is available from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20420 for $17.00 and includes changes as issued for the 1975 edition. It is also available for public use in Federal Depository Libraries.

The EPA regional offices and the Water Pollution Control Agency of each State are listed in the Appendixes. Applications for Wastewater Treatment Construction Grants should be obtained through the State Water Pollution Control Agencies. This booklet contains general information about the EPA grant programs useful to an applicant.

This booklet is revised periodically to reflect program changes and new legislation which affect EPA assistance programs.

Copies of this booklet may be obtained from the Environmental Protection Agency, Grants Information Branch, Grants Administration Division (PM-216), Office of Planning and Management, Washington, D. C. 20460.

## OTHER GRANT RELATED INFORMATION

A 200-250 word summary of a grant project is available on the majority of research and demonstration grants.

These summaries are available only for projects that have received EPA funding. In rare instances, a grant application may contain privileged information and is so designated. For these, only the award data, such as grant number, applicant's name, organization, location, grant title, grant amount awarded, and award date is available; other information may be available depending on the particular circumstances.

The Smithsonian Science Information Exchange (SSIE) Rm. 300 1730 M Street, N.W., Washington, D. C. 20036, receives a copy of the summary of a grant and makes it available to the public on a fee basis. The cost of a print-out, if the Agency is identified and the grant or contract number is provided, costs $1 per grant number with a $10 minimum fee. A search on a subject (topic) is $50 per search service for 1 to 50 titles, and in addition $10 for up to 50 additional titles. A search on the investigators name can also be performed. All inquiries and request for this service should be addressed to SSIE or phone (202) 381-5511.

## Sources of Grants Related Information

The "Awards Register-2nd Half of FY 1975", Volume I consists of two sections and lists all awards for research, demonstration, fellowships and air training grants in Section I. The format of Section I is to have the initial sort by States, then various grant programs, then awards to grantees. Each entry consists of the identification of the grantee, the program area - for example water or air, the project title, grant number, award date and dollar amount.

Section II is organized on the basis of grant numbers, in ascending order. Following the grant number is a brief description of the project to be performed. These descriptions were prepared by the grantees and are approximately 250 words in length.

Volume II of this "Awards Register-2nd Half of FY 75" is sold separately, and lists all State and local assistance grants awards.

Volume I 253 pages
EPA GAD/1075-003

Volume II 305 pages
EPA GAD/1-75-004

both available from:

National Technical Information Services
Department of Commerce
Springfield, Virginia 22151

## REPORTS GENERATED BY GRANT SUPPORTED PROJECTS

Final reports and other program reports generated by grant supported projects are published and made available if merited. Grants Administration Division does not have the responsibility for the technical monitoring of grants projects, this is the programs function; therefore, program and final report information is available from the following program offices:

for solid waste management and resource recovery:

Publication and Distribution Unit
Office of Solid Waste Management
EPA, Cincinnati, Ohio 45268

for air pollution control:

Air Research Technical Information Center
Environmental Protection Agency
Research Triangle Park, North Carolina 27711

for pesticide publications:

Information Section
Office of Pesticide Programs
EPA, Washington, D. C. 20460

for water:

Publications Branch (water) Research
Information Division
EPA, Washington, D. C. 20460

for other research and demonstration projects:

Publication Staff (RD-674)
Office of Program Management
Office of Research and Development
EPA, Washington, D. C. 20460

Each of the above units publishes a bibliographic list showing price and giving purchasing information.

In addition the National Technical Information Services (NTIS), Department of Commerce publishes a compilation of all publications submitted by EPA for sale thru the NTIS system. This includes most EPA publications and reports generated from projects receiving EPA contracts or grants.

The following EPA libraries maintain complete sets of EPA reports, on microfiche, covered by the NTIS bibliography of EPA reports;

Region I Library
Room 2211-B, JFK Federal Bldg.
Boston, Massachusetts 02203

National Marine Water Quality Lab.
P. O. Box 277
West Kingston, Rhode Island 02392

Region II Library
26 Federal Plaza
New York, New York 10007

Region II Field Office Library
Edison, New Jersey 08817

Region III Library
Curtis Bldg., 6th & Walnut Sts.
Philadelphia, Pennsylvania 19106

Headquarters Library, Rm. 2404
WSM, 401 M Street, S. W.
Washington, D. C. 20460

Region IV Library
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Reference Library
Office of Administration
Research Triangle Park, North
Carolina 27711

Southeast Environmental Research
Lab, College Station Road
Athens, Georgia 30601

Gulf Breeze Laboratory
Sabine Island, Bldg. 29
Gulf Breeze, Florida 32561

Region V Library
1 North Wacker Drive
Chicago, Illinois 60606

Centeral Technical Library
National Environmental Research Center
Cincinnati, Ohio 45268

National Water Quality Laboratory
6201 Congdon Boulevard
Duluth, Minnesota 55804

Region VI Library
1600 Patterson Street
Dallas, Texas 75201

Robert S. Kerr Environmental
Research Laboratory
P. O. Box 1198
Ada, Oklahoma 74820

Region VII Library
1735 Baltimore Avenue, Rm. 249
Kansas City, Missouri 64108

Region VIII Library
1860 Lincoln Street, Suite 900
Denver, Colorado 80203

National Field Investigation Center
Rm. A-1209, Bldg. 53
Box 25227 Denver Federal Center
Denver Colorado 80225

Region IX Library
100 California Street
San Francisco, California 94111

National Environmental Research
Center
P. O. Box 15027
Las Vegas, Nevada 89114

Region X Library
1200 Sixth Avenue
Seattle, Washington 98101

National Environmental Research
Center, 200 S.W. 35th Street
Corvallis, Oregon 97330

# SECTION I

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| | **A L A B A M A** | | | | | |
| ** RESEARCH ** | | | | | | |
| AUBURN UNIV.<br>AUBURN | WATER<br>REDUCE WATER POLLUTION BY SOLVENT BASED APPLICATION OF WARP SIZES TO YARN | WARMAN, JAMES C. | 803665010 | NEW | 03/19/75 | 54,575 |
| | | | 803665011 | INCR | 06/16/75 | 43,500 |
| AUBURN UNIV.<br>AUBURN | PESTICIDES<br>FATE & EFFECTS OF ATRAZINE IN SALT MARSH ECOSYSTEMS | ROUSE, R. D. | 803835010 | NEW | 06/16/75 | 28,980 |
| SOUTHERN RES. INST.<br>BIRMINGHAM | AIR<br>TECH. & ADMIN. SUPPORT OF WORKING GROUP ON STATIONARY SOURCE APC TECH. | OGLESBY, SABERT | 802938013 | INCR | 06/06/75 | 10,000 |
| TUSKEGEE INST.<br>TUSKEGEE INST. | COMPREHENSIVE<br>AN EVALUATION OF COVER MATERIALS FOR SANITARY LANDFILLS | NELSON, W. E. | 802412020 | CONT | 01/06/75 | 30,000 |
| TUSKEGEE INST.<br>TUSKEGEE INST. | COMPPEHENSIVE<br>RATE OF ABSORPTION OF SELENIUM FROM FOOD & WATER IN LABORATORY ANIMALS | BETTIS, ROSEAL B. | 803832010 | NEW | 06/24/75 | 48,939 |
| ** DEMONSTRATION ** | | | | | | |
| GULF STATES PAPER CORP.<br>TUSCALOOSA | WATER<br>DRAFT WASTEWATER DECOLORIZATION & REUSE BY ALUM TERTIARY TREATMENT | FULLER, ROBERT R. | 803562010 | NEW | 02/19/75 | 125,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| | A L A S K A | | | | | |
| ** RESEARCH ** | | | | | | |
| ALASKA, UNIV. OF<br>FAIRBANKS | AIR<br>STUDIES OF A SUB-ARCTIC HEAT ISLAND | BOWLING, SUE A. | 802999011 | INCR | 05/19/75 | 22,259 |
| ALASKA, UNIV. OF<br>FAIRBANKS | WATER<br>NUTRIENT CHEMISTRY OF A LARGE, DEEP LAKE IN SUB-ARTIC ALASKA | TILSWORTH, TIMOTHY | 800276030 | CONT | 05/28/75 | 75,000 |
| ALASKA, UNIV. OF<br>FAIRBANKS | WATER<br>MONOGRAPH OF THE FRESHWATER FISHES OF ALASKA | MORROW, JAMES E. | 803845010 | NEW | 05/07/75 | 20,000 |
| ALASKA, UNIV. OF<br>PALMER | CCMPREHENSIVE<br>COMPILATION OF COLD-CLIMATE & OIL-SPILL RES. & TECH. RELATIVE TO ALASKA | MCKENDRICK, JAY D. | 803843010 | NEW | 06/09/75 | 115,000 |
| ALASKA, UNIV. OF<br>FAIRBANKS | COMPREHENSIVE<br>ALASKAN OIL SEEPS: THEIR CHEMICAL & BIOLOGICAL EFFECTS ON THE INTERTIDAL | SHAW, P. G. | 803922010 | NEW | 06/06/75 | 130,000 |
| ALASKA, UNIV. OF<br>FAIRBANKS | COMPREHENSIVE<br>ASSESSMENT OF EFFECTS OF BOTTOM DISTURBANCE ON ENVRN OF SUBARCTIC STREAM | MORROW, JAMES E. | 803945010 | NEW | 06/13/75 | 47,347 |
| ALASKA, UNIV. OF<br>FAIRBANKS | COMPREHENSIVE<br>OIL SPILLS: EFFECT ON ARCTIC LAKE SYSTEMS | BARSDATE, ROBERT J. | 804152010 | NEW | 06/30/75 | 148,013 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
|  | ARIZONA |  |  |  |  |  |
| ** RESEARCH ** |  |  |  |  |  |  |
| ARIZONA, UNIV. OF<br>TUCSON | AIR<br>EFFECT OF FUEL SULFUR ON NITROGEN OXIDE FORMATION IN COMBUSTION PROCESSES | WENDT, J. O. L. | 803715010 | NEW | 05/05/75 | 62,355 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| | ARKANSAS | | | | | |
| ** FELLOWSHIPS ** | | | | | | |
| ARKANSAS, UNIV. OF<br>FAYETTEVILLE | WATER<br>M.S./SAN. ENGR. | ZODA, ARTHUR A. | 910665010 | NEW | 05/28/75 | 5,410 |
| ARKANSAS, UNIV. OF<br>FAYETTEVILLE | WATER<br>M.S./CIVIL ENGR. | DOMBEK, CHERYL F. | 910680010 | NEW | 06/11/75 | 3,380 |
| ARKANSAS, UNIV. OF<br>FAYETTEVILLE | WATER<br>M.S./CIVIL ENGR. | DAY, ROBERT L. | 910681010 | NEW | 06/11/75 | 3,380 |

## C A L I F O R N I A

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| AEROSPACE CORP.<br>LOS ANGELES | AIR<br>INSTRUMENTATION FOR PROCESS CONTROL OF AIR-BORNE ASBESTOS | ROSSI, R. C. | 802394020 | CONT | 06/27/75 | 64,977 |
| AEROSPACE CORP.<br>EL SEGUNDO | COMPREHENSIVE<br>ANALYSIS OF NOX CONTROL IN STATIONARY SOURCES | DYKEMA, O. W. | 803283020 | CONT | 05/08/75 | 92,000 |
| ATMOSPHERIC RES. GROUP<br>ALTADENA | AIR<br>GROWTH & EVAPORATION PATTERNS OF ATMOSPHERIC AEROSOL W/ RELATIVE HUMIDITY | ENSOR, DAVID S. | 802482013 | INCR | 02.19/75 | 19,700 |
| BUMPER RECYCLING ASSOC.<br>OXNARD | WATER<br>ZDS FOR NICKEL/CHROME PLATERS (BRANA) | KIPNIS, DAVID H. | 803723010 | NEW | 04/16/75 | 30,000 |
| CALIFORNIA DEPT. OF HEALTH<br>SACRAMENTO | AIR<br>INVESTIGATION OF PARTICULATE MATTER MONITORING USING CONTACT ELECTRICITY | WESOLOWSKI, JEROME J. | 803719010 | NEW | 04/30/75 | 22,286 |
| CALIFORNIA INST. OF TECH.<br>PASADENA | AIR<br>RELATIONSHIP OF THE SMOG AEROSOL TO POLLUTION SOURCES | FRIEDLANDER, S. K. | 802160030 | CONT | 02/05/75 | 74,995 |
| | | | 802160032 | INCR | 06/17/75 | 82,000 |
| CALIFORNIA INST. OF TECH.<br>PASADENA | WATER<br>FATE OF POLLUTANTS DISCHARGED FROM COASTAL OUTFALLS | MORGAN, JAMES J. | 801069030 | CONT | 06/13/75 | 47,975 |
| CALIFORNIA STATE UNIV.<br>LONG BEACH | WATER<br>EFFECT OF POLLUTANTS ON ECOLOGICALLY IMPORTANT POLYCHAETE SPECIES | REISH, DONALD J. | 800962030 | CONT | 03/26/75 | 63,300 |
| CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>PARAMETRIC STUDY OF CATALYSTS FOR NOX CONTROL FROM STATIONARY POWER PLANT | NOBE, KEN | 803653010 | NEW | 05/05/75 | 52,000 |
| CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>MODELS FOR MORTALITY RATES & SURVIVORSHIP | MURTHY, VRUDHULA K. | 803791010 | NEW | 06/02/75 | 63,652 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| CALIFORNIA |  |  |  |  |  |  |
| ** RESEARCH ** |  |  |  |  |  |  |
| CALIFORNIA, UNIV. OF<br>RIVERSIDE | AIR<br>OXIDANT/PRECURSOR RELATIONSHIPS | STEPHENS, EDGAR R. | 803799010 | NEW | 06/17/75 | 44,223 |
| CALIFORNIA, UNIV. OF<br>DAVIS | WATER<br>IRRIGATION TAILWATER MANAGEMENT | BIGGAR, JAMES W. | 803603010 | NEW | 04/09/75 | 83,520 |
| CALIFORNIA, UNIV. OF<br>BERKELEY | WATER<br>SOLVENT EXTRACTION FOR TREATMENT & RECOVERY OF CHEMICALS FROM WASTEWATER | KING, C. JUDSON | 803773010 | NEW | 05/02/75 | 47,633 |
| CALIFORNIA, UNIV. OF<br>BERKELEY | WATER<br>CHARACTERIZATION & NATURE OF ORGANIC COMPOSITION OF PETROLEUM REFINERY WW | BURLINGAME, A. L. | 803984010 | NEW | 06/30/75 | 34,355 |
| CALIFORNIA, UNIV. OF<br>LA JOLLA | WATER<br>HISTORY OF POLLUTION IN ESTUARIES | GOLDBERG, EDWARD D. | 804000020 | CONT | 05/23/75 | 31,329 |
| CALIFORNIA, UNIV. OF<br>BERKELEY | PESTICIDES<br>TOXAPHENE COMPOSITION & TOXICOLOGY | COSIDA, JOHN E. | 803913010 | NEW | 06/04/75 | 45,000 |
| CALIFORNIA, UNIV. OF<br>BERKELEY | COMPREHENSIVE<br>CHLORINATED COMPOUNDS IN COASTAL POWER PLANT COOLING WATERS | THOMAS, JEROME F. | 803959010 | NEW | 06/30/75 | 50,000 |
| HYDROCOMP, INC.<br>PALO ALTO | WATER<br>FINAL TESTING & COMPLETION OF WATER-SCALE PESTICIDE & NUTRIENT TRANSPORT | CRAWFORD, NORMAN H. | 803722010 | NEW | 04/30/75 | 88,490 |
| HYDROCOMP, INC.<br>PALO ALTO | WATER<br>BASIN MODELING OF SOIL LOSS AND SEDIMENT TRANSPORT | DONIGIAN, ANTHONY S. | 803726010 | NEW | 06/27/75 | 99,868 |
| LAC/USC MEDICAL CENTER<br>LOS ANGELES | AIR<br>A BIOLOGIC INDICATOR FOR AIR POLLUTION | SHERWIN, RUSSELL P. | 800881052 | INCR | 04/30/75 | 11,656 |
| SAN JOSE STATE UNIV. FDN.<br>SAN JOSE | WATER<br>BIOACCUMULATION OF HEAVY METALS BY LITTORAL & PELAGIC MARINE ORGANISMS | MARTIN, JOHN H. | 802350030 | CONT | 03/20/75 | 49,809 |

C A L I F O R N I A

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| SANTA CLARA, UNIV. OF<br>SANTA CLARA | AIR<br>CHARACTERIZATION & RESEARCH INVESTIGATION OF METHANOL & METHYL FUELS | PEFLEY, RICHARD | 803548010 | NEW | 01/27/75 | 98,913 |
| SOUTHERN CALIF. COASTAL WATER RES. PRO<br>EL SEGUNDO | WATER<br>SYNOPTIC SURVEY OF CHLORINATED HYDROCARBON INPUT TO SOUTHERN CALIF. BIGHT | YOUNG, DAVID R. | 803707010 | NEW | 04/16/75 | 75,000 |
| SOUTHERN CALIFORNIA, UNIV. OF<br>LOS ANGELES | SOLID WASTE<br>CASE STUDY OF HAZARDOUS WASTE INPUT INTO A CLASS I LANDFILL | CHEN, KENNETH Y. | 803813010 | NEW | 06/30/75 | 20,000 |
| STANFORD RES. INST.<br>MENLO PARK | AIR<br>MEASUREMENT OF RATE CONSTANTS OF IMPORTANCE IN SMOG | GOLDEN, DAVID M. | 802288030 | CONT | 03/03/75 | 54,000 |
|  |  |  | 802288031 | INCR | 04/30/75 | 14,749 |
| STANFORD RES. INST.<br>MENLO PARK | AIR<br>ATMOSPHERIC FATES OF HALOGENATED COMPOUNDS | SINGH, HANWANT BIR | 803802010 | NEW | 06/18/75 | 69,549 |
| STANFORD RES. INST.<br>MENLO PARK | AIR<br>REACTIONS OF OXY RADICALS IN THE ATMOSPHERE | HENDRY, DALE G. | 803846010 | NEW | 06/27/75 | 95,000 |
| STANFORD RES. INST.<br>MENLO PARK | WATER<br>STATIC HIGH PRESSURE METHOD FOR PRESERVING WATER SAMPLES | BOHONOS, NESTOR | 803809010 | NEW | 06/12/75 | 25,000 |
| STANFORD RES. INST.<br>MENLO PARK | COMPREHENSIVE<br>CRITERIA FOR INSTITUTIONAL ARRANGEMENTS FOR REGIONAL ENVRN. MGMT. | DUCKSTAD, ERIC | 803847010 | NEW | 06/16/75 | 34,799 |

** DEMONSTRATION **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| CALIFORNIA STATE WATER RESOURCES BD.<br>SACRAMENTO | WATER<br>REDUCE UNIT TOXICITY EMISSION RATE FROM WWT PLANTS BY DESIGN OPTIMIZATION | DENDY, BILL | 803459010 | NEW | 04/16/75 | 344,200 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | **C A L I F O R N I A** | | | | |
| ** DEMONSTRATION ** | | | | | | |
| MOUNTAIN VIEW, CITY OF<br>MOUNTAIN VIEW | SOLID WASTE<br>SHORELINE REGIONAL PARK GAR RECOVERY PROJECT. | CARLSON, JOHN A. | 803396011 | INCR | 06/18/75 | 200,000 |
| ORANGE CNTY. WATER DIST.<br>FOUNTAIN VALLEY | WATER<br>EVALUATION OF FULL SCALE WASTEWATER REUSE SYSTEM FOR DOMESTIC GROUNDWATER | ARGO, DAVID G. | 803873010 | NEW | 06/26/75 | 95,000 |
| SAN FRANCISCO CITY & CNTY.<br>SAN FRANCISCO | WATER<br>DEMONSTRATE REAL-TIME AUTOMATIC CONTROL OF COMBINED SEWER SYSTEMS | FRIEDLAND, A. O. | 803743010 | NEW | 05/16/75 | 65,000 |
| SIMPSON LEE PAPER CO.<br>ANDERSON | WATER<br>WASTE TREATMENT PLANT MODIFICATION WITH IN-PLANT WATER RECYCLING | NARUM, Q. A. | 803689010 | NEW | 05/23/75 | 142,000 |
| ** TRAINING ** | | | | | | |
| CALIFORNIA STATE DEPT. OF HEALTH<br>SACRAMENTO | AIR<br>CONFERENCE ON METHODS IN AIR POLLUTION STUDIES | WESOLOWSKI, JEROME J. | 900665010 | NEW | 06/30/75 | 21,288 |
| CALIFORNIA STATE UNIV.<br>SACRAMENTO | WATER<br>CORRESPONDENCE SCH & CLASSROOM TRAINING PROGRAM FOR MAINTENANCE PERSONNEL | KERRI, KENNETH D. | 900494013 | INCR | 01/23/75 | 30,024 |
| | | | 900494020 | CONT | 06/09/75 | 30,024 |
| CALIFORNIA, UNIV. OF<br>BERKELEY | WATER<br>SAN. ENGR. | SELLECK, ROBERT E. | 900190052 | INCR | 04/29/75 | 466 |
| HUMBOLDT STATE UNIV.<br>ARCATA | WATER<br>INSTRUCTIONAL DEVELOPMENT WORKSHOPS | GEARHEART, ROBERT A. | 900664010 | NEW | 06/06/75 | 46,159 |
| SOUTHERN CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>ENVIRONMENTAL MANAGEMENT INSTITUTE | BARBARO, GLORIA C. | 900557010 | NEW | 06/24/75 | 208,234 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| C A L I F O R N I A | | | | | | |
| ** TRAINING ** | | | | | | |
| SOUTHERN CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>DISSEMINATION OF APEX II | MCGINTY, RICHARD | 900558010 | NEW | 06/04/75 | 16,613 |
| ** FELLOWSHIPS ** | | | | | | |
| ANTIOCH COLLEGE/WEST<br>LOS ANGELES | AIR<br>B.A./MGMT. | DANZIG, ALLEN L. | 910524010 | NEW | 01/27/75 | 3,465 |
| CALIFORNIA STATE COLLEGE<br>CARSON | AIR<br>M.S./ENVRN. STUDIES | GEORGE, RALPH E. | 910584010 | NEW | 06/11/75 | 2,185 |
| CALIFORNIA STATE UNIV.<br>SACRAMENTO | WATER<br>M.S./CIVIL ENGR. | MARSHALL, WILLIAM J. | 910636010 | NEW | 06/17/75 | 6,500 |
| CALIFORNIA, UNIV. OF<br>IRVINE | AIR<br>M.S./ENVRN. ENGR. | GRIFFIN, ROGER D. | 910674010 | NEW | 06/11/75 | 1,620 |
| SOUTHERN CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>M.S./PUBLIC ADMINISTRATION | RUBY, FREDERICK B. | 910525010 | NEW | 05/21/75 | 2,975 |
| SOUTHERN CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>M.S./ENVRN. ENGR. | REDEMER, MICHAEL D. | 910594010 | NEW | 05/19/75 | 8,079 |
| SOUTHERN CALIFORNIA, UNIV. OF<br>LOS ANGELES | AIR<br>M.S./ENVRN. ENGR. | BLEDSOE, WILLIAM A. | 910694010 | NEW | 06/24/75 | 8,080 |
| STANFORD UNIV.<br>STANFORD | WATER<br>M.S./CIVIL ENGR. | PINKOS, THOMAS R. | 910617010 | NEW | 05/28/75 | 6,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| | COLORADO | | | | | |
| ** RESEARCH ** | | | | | | |
| BOULDER, CITY OF<br>BOULDER | WATER<br>EVALUATION OF HIGH-RATE INFILTRATION-PERCOLATION BEDS TO IMPROVE WATER | SMITH, DOUGLAS G. | 803931010 | NEW | 06/30/75 | 126,986 |
| COLORADO STATE UNIV.<br>FORT COLLINS | AIR<br>STUDIES OF EFFECTS OF ATMOSPHERIC EFFLUENTS ON A TERRESTRIAL ECOSYSTEM | DODD, JERROLD L. | 803176020 | CONT | 05/13/75 | 104,448 |
| COLORADO STATE UNIV.<br>FORT COLLINS | AIR<br>MEASURING PARTICLE SIZE DISTRIBUTION IN REAL-TIME | CHAN, P. O. | 803532010 | NEW | 04/02/75 | 40,713 |
| COLORADO STATE UNIV.<br>FORT COLLINS | AIR<br>RESIDENCE TIME OF ANTHROPOGENIC POLLUTANTS & LONG-RANGE TRANSPORT | REITER, ELMAR R. | 803685010 | NEW | 03/21/75 | 47,840 |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>VEGETATIVE STABILIZATION OF SPENT OIL SHALES | BERG, WILLIAM A. | 803059020 | CONT | 05/12/75 | 14,532 |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>SURFACE & SUBSURFACE WATER QUALITY HYDROLOGY IN MINE SPOILS | MCWHORTER, DAVID B. | 803175020 | CONT | 05/21/75 | 146,812 |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>SOCIO-ECONOMICS & INSTITUTIONAL FACTORS IN IRRIGATION RETURN FLOW QUALITY | VLACHOS, EVAN | 803572010 | NEW | 01/10/75 | 103,195 |
| COLORADO STATE UNIV.<br>FT. COLLINS | WATER<br>INTEGRATING DESALINATION & AGRICULTURAL SALINITY CONTROL TECHNOLOGIES | WALKER, WYNN R. | 803869010 | NEW | 06/17/75 | 35,000 |
| COLORADO STATE UNIV.<br>FORT COLLINS | COMPREHENSIVE<br>STUDIES OF EFFECTS OF ATMOSPHERIC EFFLUENTS ON A TERRESTRIAL ECOSYSTEM | DODD, JERROLD L. | 803176021 | INCR | 06/06/75 | 23,965 |
| COLORADO STATE UNIV.<br>FORT COLLINS | COMPREHENSIVE<br>WATER QUALITY HYDROLOGY AFFECTED BY OIL SHALE DEVELOPMENT | MCWHORTER, DAVID R. | 803684010 | NEW | 05/02/75 | 99,350 |
| COLORADO STATE UNIV.<br>FORT COLLINS | COMPREHENSIVE<br>VEGETATIVE STABILIZATION OF PARAHO SPENT OIL SHALE | BERG, WILLIAM A. | 803788010 | NEW | 06/17/75 | 94,110 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | C O L O R A D O | | | | | |
| ** RESEARCH ** | | | | | | |
| COLORADO STATE UNIV.<br>FORT COLLINS | COMPREHENSIVE<br>TOXIC EFFECTS ON THE AQUATIC BIOTA FROM COAL & OIL SHALE DEVELOPMENT | SKOGERBOE, R. K. | 803950010 | NEW | 06/13/75 | 600,000 |
| COLORADO, UNIV. OF<br>BOULDER | WATER<br>WORKSHOP ON RESEARCH NEEDS IN WASTEWATER RENOVATION & REUSE | BENNETT, EDWIN R. | 803546011 | INCR | 03/06/75 | 6,508 |
| COLORADO, UNIV. OF<br>BOULDER | WATER<br>HEALTH EFFECTS DATA & CRITERIA DOCUMENT RECOMMENDING WATER STANDARDS | CHAPPELL, WILLARD R. | 803645010 | NEW | 03/17/75 | 68,490 |
| COLORADO, UNIV. OF<br>BOULDER | WATER<br>SEWAGE DISPOSAL BY EVAPORATION-TRANSPIRATION | BENNETT, EDWIN R. | 803871010 | NEW | 06/06/75 | 45,800 |
| DENVER, UNIV. OF<br>DENVER | AIR<br>SYMPOSIUM ON THE DENVER (1973) AIR POLLUTION FIELD STUDY | RUDD, C. D. | 803590011 | INCR | 04/29/75 | 1,282 |
| UPPER THOMPSON SAN. DIST.<br>ESTES PARK | WATER<br>AN EVALUATION OF POLLUTION CONTROL PROCESSES- UPPER THOMPSON SAN. DIST. | GERE, GILES H. | 803831010 | NEW | 05/29/75 | 250,000 |
| ** DEMONSTRATION ** | | | | | | |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>IRRIGATION PRACTICES, RETURN FLOW SALINITY & CROP YIELDS PHASE I | SKOGERBOE, GAYLORD V. | 800687031 | INCR | 04/30/75 | 69,052 |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>RECYCLE & UTILIZATION OF LIVESTOCK MANURE THRU SUBSURFACE INJECTION | BROWN, JAMES F. | 802940012 | INCR | 02/21/75 | 23,185 |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>IMPLEMENTATION OF AGRICULTURAL SALINITY CONTROL TECH. IN GRAND VALLEY | SKOGERBOE, GAYLORD V. | 802985020 | CONT | 01/10/75 | 194,337 |
| DENVER METRO. SEWAGE DISPOSAL DIST. #1<br>COMMERCE CITY | WATER<br>DEMONSTRATION OF FULL SCALE OPEN TANK PURE OXYGEN ACTIVATED SLUDGE SYSTEM | PUNTENNEY, JOHN L. | 803910010 | NEW | 06/17/75 | 200,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| C O L O R A D O | | | | | | |
| ** DEMONSTRATION ** | | | | | | |
| DENVER REGIONAL COUNCIL OF GOVTS.<br>DENVER | SOLID WASTE<br>RESOURCE RECOVERY PROJECT | FOSTER, ALAN L. | 804064010 | NEW | 06/30/75 | 70,000 |
| ** TRAINING ** | | | | | | |
| COLORADO STATE UNIV.<br>FORT COLLINS | AIR<br>TRAINING PROGRAM ON MOTOR VEHICLE EMISSION CONTROL FOR AUTOMOTIVE TEACHER | HAYES, B. D. | 900548010 | NEW | 06/30/75 | 96,009 |
| ** FELLOWSHIPS ** | | | | | | |
| COLORADO STATE UNIV.<br>FORT COLLINS | WATER<br>M.S./CIVIL ENGR. | PURINGTON, JAMES H. | 910657010 | NEW | 05/23/75 | 6,500 |
| COLORADO UNIV.<br>BOULDER | AIR<br>M.S./ENGR. | PLOG, JOHN G. | 910528010 | NEW | 02/03/75 | 529 |
| COLORADO, UNIV. OF<br>BOULDER | AIR<br>M.S./ENVRN. MGMT./PUBLIC ADMIN. | JORGENSON, ROBERT A. | 910441011 | INCR | 06/20/75 | 48 |
| COLORADO, UNIV. OF<br>BOULDER | AIR<br>M.S./ENVRN. MGMT./PUBLIC ADMIN. | WILSON, BRUCE W. | 910458011 | INCR | 06/20/75 | 48 |
| COLORADO, UNIV. OF<br>DENVER | AIR<br>M.S./URBAN & REGIONAL PLANNING/ URBAN AFFAIRS | STEWART, ALAN M. | 910566010 | NEW | 05/28/75 | 782 |
| COLORADO, UNIV. OF<br>DENVER | AIR<br>B.S./CIVIL ENGR. | KINSEY, JOHN S. | 910659010 | NEW | 06/24/75 | 525 |
| DENVER, UNIV. OF<br>DENVER | AIR<br>M.S./MASS COMMUNICATIONS | KOESTER, ELLEN H. | 910663010 | NEW | 06/11/75 | 2,200 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | C O N N E C T I C U T | | | | | |
| ** RESEARCH ** | | | | | | |
| CONNECTICUT, UNIV. OF<br>STORRS | WATER<br>SELECTIVE MEDIUM FOR CANIDA ALBICANS | BUCK, JOHN D. | 802827012 | INCR | 05/14/75 | 9,488 |
| CONNECTICUT, UNIV. OF<br>STORRS | WATER<br>REFRACTORY INDICES FOR ORGANIC INDUSTRIAL WASTES | HELFGOTT, T. | 803231013 | INCR | 06/26/75 | 4,490 |
| INTERNATIONAL OZONE INST., INC.<br>WATERBURY | WATER<br>STATE OF THE ART STUDY ON OZONE FOR INDUSTRIAL WATER & WW TREATMENT | BROWNING, MYRON | 803357013 | INCR | 06/27/75 | 8,002 |
| RISDON MANUFACTURING CO.<br>WATERBURY | WATER<br>NICKEL RECOVERY & POLLUTION CONTROL BY ELECTRODIALYSIS | KENNEDY, JAMES R. | 803742010 | NEW | 04/30/75 | 25,000 |
| ** DEMONSTRATION ** | | | | | | |
| ENFIELD, TOWN OF<br>ENFIELD | SOLID WASTE<br>LEACHATE TREATMENT BY ANAEROBIC FILTER | KISSINGER, C. SAMUEL | 803627010 | NEW | 03/17/75 | 200,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | DELAWARE | | | | | |
| ** RESEARCH ** | | | | | | |
| DELAWARE, UNIV. OF<br>NEWARK | WATER<br>DURABILITY OF HETEROGENEOUS, AQUEOUS-PHASE OXIDATION CATALYST FOR IND WWT | KATZER, JAMES R. | 803702010 | NEW | 04/08/75 | 26,045 |

## D I S T R I C T   O F   C O L U M B I A

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| AMERICAN DEFENSE PREPAREDNESS ASSOC.<br>WASHINGTON | WATER<br>STATE OF THE ART OF EXPLOSIVES MANUFACTURING INDUSTRY | SULLIVAN, ARTHUR D. | 802872013 | INCR | 06/27/75 | 5,000 |
| ENVIRONMENTAL LAW INST.<br>WASHINGTON | SOLID WASTE<br>EVALUATION OF ECONOMIC BENEFITS OF RESOURCE CONSERVATION THRU RECYCLING | ANDERSON, ROBERT C. | 803880010 | NEW | 06/30/75 | 50,000 |
| HOWARD UNIV.<br>WASHINGTON | COMPREHENSIVE<br>EFFICIENCY OF OFF-STREAM DETENTION-RETENTION MEASURE FOR SEDIMENT CONTROL | YEN, CHIN-LIEU | 803066020 | CONT | 06/04/75 | 11,124 |
| HOWARD UNIV.<br>WASHINGTON | COMPREHENSIVE<br>GENETIC & CELLULAR EFFECT OF MICROWAVE RADIATION | DUTTA, S. K. | 803561010 | NEW | 04/10/75 | 38,135 |
| PUBLIC TECHNOLOGY, INC.<br>WASHINGTON | WATER<br>ASSISTANCE TO EPA IN ESTABLISHMENT & IMPLEMENTATION OF TECH WORKING GROUP | MILLER, G. WADE | 803995010 | NEW | 06/06/75 | 19,400 |
| ** DEMONSTRATION ** | | | | | | |
| AMERICAN FROZEN FOOD INST.<br>WASHINGTON | WATER<br>INTEGRATED IBQ VIBRATORY BLANCH-COOLER FOR REDUCING POLLUTION | FARQUHAR, JOHN W. | 803312012 | INCR | 02/28/75 | 7,700 |
| NATIONAL ASSOC. OF COUNTIES RES. FDN.<br>WASHINGTON | SOLID WASTE<br>ASSISTANCE DELIVERY PROGRAM FOR COUNTIES | MASLIN, WILLIAM R. | 802768015 | INCR | 03/06/75 | 48,714 |
| | | | 802768016 | INCR | 06/18/75 | 11,604 |
| NATIONAL CANNERS ASSOC.<br>WASHINGTON | WATER<br>TOMATO CLEANING & WATER RECYCLE | ROSE, WALTER W. | 803251013 | INCR | 03/24/75 | 124,300 |
| ** TRAINING ** | | | | | | |
| AMERICAN FORESTRY ASSOC.<br>WASHINGTON | WATER<br>APPROACHES TO NON-POINT SOURCE POLLUTION CONTROL IN FORESTRY ACTIVITIES | PARDO, RICHARD | 900544010 | NEW | 04/02/75 | 52,516 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| D I S T R I C T O F C O L U M B I A | | | | | | |
| ** TRAINING ** | | | | | | |
| ENVIRONMENTAL ACTION FUN., INC.<br>WASHINGTON | SOLID WASTE<br>CITIZEN SOLID WASTE COMMUNICATIONS NETWORK | BASS, R. DENNIS | 900551010 | NEW | 04/28/75 | 54,419 |
| ENVIRONMENTAL POLICY INST.<br>WASHINGTON | SOLID WASTE<br>HAZARDOUS MATERIALS DISPOSAL WORKSHOPS | MESSING, MARC | 900667010 | NEW | 06/17/75 | 38,124 |
| NATIONAL ASSOC. OF CONSERV. DISTS.<br>WASHINGTON | WATER<br>MANPOWER EDUCATION & TRAINING FOR SEDIMENT CONTROL | UNGER, DAVID G. | 900556010 | NEW | 05/28/75 | 60,000 |
| NATIONAL WILDLIFE FEDERATION<br>WASHINGTON | SOLID WASTE<br>INTEGRATED SOLID WASTE MANAGEMENT & THE ROLE OF LANDFILLS | WILLSON, PETERS D. | 900666010 | NEW | 06/17/75 | 37,362 |
| OIL, CHEMICAL & ATOMIC WORKERS UNION<br>WASHINGTON | SOLID WASTE<br>OCAW HAZARDOUS WASTE EDUCATIONAL PROGRAM | MAZZOCCHI, ANTHONY | 900670010 | NEW | 06/27/75 | 40,100 |
| TECHNICAL INFORMATION PROJECT<br>WASHINGTON | SOLID WASTE<br>CITIZEN SOLID WASTE EDUCATION PROGRAM | PURCELL, ARTHUR H. | 900550010 | NEW | 04/28/75 | 48,200 |
| ** FELLOWSHIPS ** | | | | | | |
| GEORGE WASHINGTON UNIV.<br>WASHINGTON | AIR<br>LL.M/ENVRN. LAW | DODSON, GERALD P. | 910554010 | NEW | 05/19/75 | 7,520 |
| GEORGE WASHINGTON UNIV.<br>WASHINGTON | WATER<br>M.S./ADMINISTRATION | BENIL, CHARLES N. | 910690010 | NEW | 06/20/75 | 1,840 |

# F L O R I D A

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MECIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| FLORIDA STATE UNIV.<br>TALLAHASSEE | AIR<br>SOURCES & TRANSPORT OF TRACE METALS IN URBAN AEROSOLS | WINCHESTER, JOHN W. | 802132030 | CONT | 03/04/75 | 64,083 |
| FLORIDA STATE UNIV.<br>TALLAHASSEE | AIR<br>ELEMENTAL QUANTITATIVE ANALYSIS OF AIR PARTICULATES BY PROTON SCATTERING | NELSON, J. WILLIAM | 802913020 | CONT | 05/29/75 | 20,000 |
| FLORIDA STATE UNIV.<br>TALLAHASSEE | WATER<br>ANALYSIS OF STATISTICAL METHODS USED TO DETERMINE EFFECTS OF POLLUTANTS | LIVINGSTON, ROBERT J. | 803339020 | CONT | 06/18/75 | 40,700 |
| FLORIDA STATE UNIV.<br>TALLAHASSEE | COMPREHENSIVE<br>SOURCES & TRANSPORT OF TRACE METALS IN URBAN AEROSOLS | WINCHESTER, JOHN W. | 802132031 | INCR | 05/19/75 | 60,800 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | AIR<br>STUDY OF INTERFACE PROBLEMS IN SAMPLING & MEASUREMENT OF PARTICULATES | LUNDGREN, DALE A. | 803692010 | NEW | 04/08/75 | 30,000 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | WATER<br>FERTILIZER & PESTICIDE MOVEMENT IN DRAINAGE & RUNOFF WATERS | MANSELL, ROBERT S. | 800517030 | CONT | 04/14/75 | 40,000 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | WATER<br>A GUIDE FOR PLANNING FOR CONTROL OF URBAN STORM & COMBINED SEWER RUNOFF | HUBER, WAYNE C. | 802411020 | CONT | 04/02/75 | 69,071 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | WATER<br>SIMULATION OF NITROGEN MOVEMENT & TRANSFORMATIONS IN THE PLANT ROOT ZONE | DAVIDSON, JAMES M. | 803607010 | NEW | 02/11/75 | 37,971 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | WATER<br>COSTS OF RADIUM REMOVAL FROM POTABLE WATER SUPPLIES | SINGLEY, J. E. | 803864010 | NEW | 06/17/75 | 58,478 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | SOLID WASTE<br>PESTICIDE MIGRATION & DEGRADATION IN SOIL RECEIVING HIGH CHEM CONCENTRATE | DAVIDSON, JAMES M. | 803849010 | NEW | 06/30/75 | 57,521 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | PESTICIDES<br>WATER QUALITY & MANGROVE ECOSYSTEM DYNAMICS | SNEDAKER, SAMUEL C. | 803340020 | CONT | 06/17/75 | 38,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| F L O R I D A | | | | | | |
| ** RESEARCH ** | | | | | | |
| MIAMI, UNIV. OF<br>CORAL GABLES | WATER<br>INFLUENCE ON H2O QUALITY OF INCREASED TEMPERATURE AFFECTING PARTICULATES | DROST-HANSEN, W. | 803826010 | NEW | 06/02/75 | 18,977 |
| MIAMI, UNIV. OF<br>MIAMI | WATER<br>ISOLATION & STUDY OF CHLORO-ORGANICS RESULTING FROM CHLORINATION | CARPENTER, JAMES H. | 803893010 | NEW | 06/11/75 | 160,000 |
| ROSENSTIEL SCH. MARINE&ATMOSPHERIC SCI<br>MIAMI | WATER<br>DENSITY-DEPENDENT FACTOR & EFFECT OF GROWTH &SURVIVAL OF SPOTTED SEATROUT | HOUDE, EDWARD D. | 80370[illegible]10 | NEW | 04/08/75 | 12,000 |
| ** TRAINING ** | | | | | | |
| CENTRAL FLORIDA COMMUN. COLLEGE<br>OCALA | RADIATION<br>RADIOLOGICAL HEALTH TECHNICIAN TRAINING PROJECT | WALTERS, JAMES H. | 900283102 | INCR | 01/10/75 | 23,000 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | AIR<br>AIR POLLUTION TRAINING PROGRAM | URONE, PAUL | 900542010 | NEW | 05/29/75 | 53,566 |
| MIAMI-DADE COMMUN. COLLEGE<br>MIAMI | WATER<br>NPDES EFFLUENT MONITORING TRAINING | PISTORINA, JOHN C. | 900520012 | INCR | 04/22/75 | 19,975 |
| ** FELLOWSHIPS ** | | | | | | |
| FLORIDA, UNIV. OF<br>GAINESVILLE | AIR<br>M.S./CIVIL ENGR. | GOSNEY, JOSEPH R. | 910341011 | INCR | 01/16/75 | 272 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | AIR<br>M.S./ENVRN. ENGR. | ALDENDERFER, DAVID | 910483010 | NEW | 02/21/75 | 9,180 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | AIR<br>M.S./ENVRN. ENGR. SCIENCES | NELSON, BYRON E. | 910527010 | NEW | 05/23/75 | 7,780 |
| FLORIDA, UNIV. OF<br>GAINESVILLE | WATER<br>M.S./ENVRN. ENGR. | YAO, MAXWELL C. | 910661010 | NEW | 05/29/75 | 6,500 |

## G E O R G I A

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| ** RESEARCH ** | | | | | | |
| GEORGIA INST. OF TECH.<br>ATLANTA | SOLID WASTE<br>DEVELOPMENT OF PROTOTYPE PORTABLE SYSTEM FOR PYROLYSIS OF AGRI. WASTES | TATOM, JOHN | 803430010 | NEW | 03/26/75 | 73,770 |
| GEORGIA STATE UNIV.<br>ATLANTA | PESTICIDES<br>MICROBIAL INTERACTIONS WITH PESTICIDES IN ESTUARINE SURFACE SLICKS | AHEARN, DONALD G. | 803141020 | CONT | 03/05/75 | 47,998 |
| | | | 803141021 | INCR | 05/13/75 | 11,600 |
| GEORGIA, UNIV. OF<br>ATHENS | WATER<br>FATE OF PESTICIDES IN H2O & SOIL-SURFACTANT EFFECT ON PESTICIDE PHOTOCHEM | HAUTALA, RICHARD R. | 802959020 | CONT | 02/26/75 | 59,089 |
| GEORGIA, UNIV. OF<br>ATHENS | WATER<br>FATE OF CADIMUM INTRODUCED INTO ARTIFICIAL STREAM SYSTEMS | GIESY, JOHN | 803714010 | NEW | 04/16/75 | 103,712 |
| ** TRAINING ** | | | | | | |
| ATLANTA UNIV. CTR.<br>ATLANTA | WATER<br>UNDERGRAD TRAINING PROGRAM IN WATER POLLUTION CONTROL DESIGN ENGINEERING | MERIDETH, CHARLES W. | 900505020 | CONT | 06/27/75 | 30,004 |
| ATLANTA UNIV. CTR.<br>ATLANTA | WATER<br>SUMMER TRAINING IN WATER & WASTEWATER | MERIDETH, CHARLES W. | 900560010 | NEW | 06/09/75 | 3,513 |
| GEORGIA INST. OF TECH.<br>ATLANTA | AIR<br>GEORGIA TECH. AIR QUALITY CONTROL TRAINING PROGRAM | ORR, CLYDE | 900499032 | INCR | 06/20/75 | 19,395 |
| SAVANNAH STATE COLLEGE<br>SAVANNAH | WATER<br>WATER POLLUTION CONTROL-OPERATOR TRAINING | SCOTT, WILTON G. | 900519014 | INCR | 03/24/75 | 10,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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## HAWAII

** FELLOWSHIPS **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| HAWAII, UNIV. OF<br>HONOLULU | AIR<br>M.S./ENVRN. HEALTH | HANLEY, JOHN J. | 910652010 | NEW | 06/04/75 | 8,365 |

| APPLICANT<br>MUNICIPALITY | MECIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | I D A H O | | | | | |
| ** RESEARCH ** | | | | | | |
| IDAHO DEPT. OF WATER RESOURCES<br>BOISE | WATER<br>IRRIGATION WASTE WATER DISPOSAL WELL STUDIES-SNAKE PLAIN AQUIFER | PUTKEY, THOMAS | 802931020 | CONT | 04/02/75 | 56,965 |

## I L L I N O I S

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| AMERICAN PUBLIC WORKS ASSOC.<br>CHICAGO | WATER<br>ANALYSIS OF PRACTICES FOR PREPARING ECON. ANALYSIS & DETERMINING INFLOW | SULLIVAN, RICHARD H. | 803151012 | INCR | 03/05/75 | 74,879 |
| BOATING INDUSTRY ASSOC.<br>CHICAGO | WATER<br>ANALYSIS OF POLLUTION FROM MARINE ENGINES & EFFECTS ON THE ENVRN. | KAUFMAN, MATT | 801799027 | INCR | 06/18/75 | 3,000 |
| CHICAGO MEDICAL SCHOOL<br>CHICAGO | WATER<br>METHOD FOR DETECTION OF ONCOGENIC & NONONCOGENIC VIRUSES IN POLLUTED H2O | BROWN, ERIC REEDER | 802087020 | NEW | 03/20/75 | 58,000 |
| CHICAGO, UNIV. OF<br>CHICAGO | COMPREHENSIVE<br>IMPACT OF UNIFORM ENFORCEMENT OF NATURAL ENVIRONMENTAL QUALITY STANDARDS | CHERNICK, CEDRIC L. | 804005012 | INCR | 05/30/75 | 5,250 |
| DEPAUL UNIV.<br>CHICAGO | WATER<br>POLYCHLOROBIPHENYLS IN THE ATMOSPHERE & IN PRECIPITATION IN THE LAKE MICH | MURPHY, THOMAS J. | 803915010 | NEW | 06/17/75 | 9,200 |
| IIT RES. INST.<br>CHICAGO | AIR<br>A STUDY OF SOME IMPORTANT AIR POLLUTANTS | SOLOMON, I. J. | 803805010 | NEW | 06/30/75 | 95,418 |
| IIT RES. INST.<br>CHICAGO | COMPREHENSIVE<br>STUDY OF THE IDENTITY & SOURCES OF ATMOSPHERIC AEROSOLS | DRAFTZ, RONALD G. | 803078021 | INCR | 06/30/75 | 20,000 |
| ILLINOIS, UNIV. OF<br>URBANA | AIR<br>VERTICAL FLUXES & EXCHANGE COEFFICIENTS OVER ST. LOUIS | ACKERMAN, BERNICE | 803682010 | NEW | 03/25/75 | 16,000 |
| | | | 803682011 | INCR | 05/28/75 | 28,000 |
| ILLINOIS, UNIV. OF<br>URBANA | WATER<br>VIRUS SENSITIVITY TO CHLORINE DISINFECTION OF WATER SUPPLIES | ENGELBRECHT, R. S. | 803346011 | INCR | 01/17/75 | 14,609 |
| | | | 803346020 | CONT | 06/06/75 | 65,085 |

## I L L I N O I S

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| ILLINOIS, UNIV. OF<br>CHICAGO | WATER<br>HEALTH EFFECTS OF HUMAN EXPOSURE TO BARIUM IN DRINKING WATER | BRENNIMAN, GARY R. | 803918010 | NEW | 06/30/75 | 81,179 |
| ILLINOIS, UNIV. OF<br>URBANA | SOLID WASTE<br>LITERATURE SURVEY OF DATA ON SOIL DEGRADATION OF SELECT PESTICIDES | SPRUGEL, GEORGE | 803591010 | NEW | 01/22/75 | 25,658 |
| ILLINOIS, UNIV. OF<br>URBANA | SOLID WASTE<br>EFFECT OF MOISTURE REGIMEN ON SOLID WASTE STABILIZATION | CHIAN, E. S. K. | 803652010 | NEW | 04/16/75 | 24,403 |
| ILLINOIS, UNIV. OF<br>URBANA | PESTICIDES<br>DESIGN & EVALUATION OF A TERRESTRIAL MODEL ECOSYSTEM | METCALF, ROBERT L. | 803249020 | CONT | 06/02/75 | 73,276 |
| ILLINOIS, UNIV. OF<br>URBANA | COMPREHENSIVE<br>MINERAL MATTER IN COAL | GLUSKOTER, HAROLD J. | 800059090 | CONT | 02/20/75 | 41,659 |
| ITT RES. INST.<br>CHICAGO | WATER<br>CYANIDE REMOVAL FROM PETROLEUM REFINERIES | HUFF, JAMES E. | 804029010 | NEW | 06/26/75 | 51,162 |
| PAWNEE, VILLAGE OF<br>PAWNEE | WATER<br>ONE-YEAR PERFORMANCE EVALUATION OF EXISTING AERATED LAGOON SYSTEM, PAWNEE | ALEXANDER, ROGER | 803900010 | NEW | 06/17/75 | 43,437 |
| ** DEMONSTRATION ** | | | | | | |
| GREATER CHICAGO METRO. SAN. DIST.<br>CHICAGO | WATER<br>AGRI. BENEFITS & ENVRN. CHANGES RESULTING FROM USE OF DIGESTED SLUDGE | BRAXTON, JAMES S. | 801356030 | CONT | 06/04/75 | 200,000 |
| PICKLE PACKERS INTERNATIONAL, INC.<br>ST. CHARLES | WATER<br>REDUCTION OF WASTE IN THE PICKLING INDUSTRY BY BRINE RECYCLING | BLUM, HERMAN | 803825010 | NEW | 06/25/75 | 84,381 |
| ** TRAINING ** | | | | | | |
| AMERICAN PUBLIC WORKS ASSOC.<br>CHICAGO | WATER<br>TRAINING IN PERFORMANCE EVALUATION & TROUBLE SHOOTING PROCEDURES | SULLIVAN, RICHARD H. | 900535010 | NEW | 02/14/75 | 60,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| **I L L I N O I S** | | | | | | |
| ** TRAINING ** | | | | | | |
| | | | 900535011 | INCR | 06/26/75 | 30,772 |
| ILLINOIS, UNIV. OF<br>URBANA | AIR<br>AIR RESOURCES | STUKEL, JAMES J. | 900203060 | CONT | 06/30/75 | 32,297 |
| SOUTHERN ILLINOIS UNIV.<br>EDWARDSVILLE | WATER<br>NPDES EFFLUENT MONITORING PROCEDURES TRAINING PROGRAM | HORD, WILLIAM E. | 900534010 | NEW | 03/06/75 | 25,616 |
| ** FELLOWSHIPS ** | | | | | | |
| ILLINOIS, UNIV. OF<br>URBANA | AIR<br>M.S./MECHANICAL ENGR. | KORYTO, MICHAEL J. | 910545010 | NEW | 05/21/75 | 8,864 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| I N D I A N A | | | | | | |
| ** RESEARCH ** | | | | | | |
| NOTRE DAME, UNIV. OF<br>NOTRE DAME | AIR<br>COLLECTION & ASSESSMENT OF SUB-MICRON PARTICULATE MATTER | MCFARLAND, ANDREW R. | 803594010 | NEW | 02/11/75 | 18,998 |
| NOTRE DAME, UNIV. OF<br>NOTRE DAME | WATER<br>INTERDISCIPLINARY EVALUATION OF EUTROPHIC LAKE RECLAMATION | IRVINE, ROBERT L. | 801245050 | CONT | 06/30/75 | 69,600 |
| NOTRE DAME, UNIV. OF<br>NOTRE DAME | COMPREHENSIVE<br>COLLECTION & ASSESSMENT OF SUB-MICRON PARTICULATE MATTER | MCFARLAND, ANDREW R. | 803594011 | INCR | 05/28/75 | 19,766 |
| PURDUE RES. FDN.<br>WEST LAFAYETTE | AIR<br>EMISSIONS FROM AIRCRAFT FUEL NOZZLE FLAMES | MELLOR, A. M. | 802650020 | NEW | 04/22/75 | 57,458 |
| PURDUE RES. FDN.<br>WEST LAFAYETTE | WATER<br>FRESHWATER QUALTIY-MONITORING & METHODOLOGIES UTILIZING SALMONELLA | MORSE, ERSKINE V. | 803741010 | NEW | 06/13/75 | 22,833 |
| PURDUE UNIV.<br>WEST LAFAYETTE | PESTICIDES<br>TOXICITY, INTERACTIONS, & METABOLISM OF IMPORTANT PESTICIDES IN MAMMALS | HOLLINGWORTH, ROBERT M. | 803965010 | NEW | 06/16/75 | 57,706 |
| ** FELLOWSHIPS ** | | | | | | |
| BALL STATE UNIV.<br>MUNCIE | WATER<br>M.S./URBAN & REGIONAL PLANNING | SHAVER, MICHAEL R. | 910574010 | NEW | 06/17/75 | 4,392 |
| EVANSVILLE, UNIV. OF<br>EVANSVILLE | AIR<br>A.A./ENVRN. MGMT. | BEACH, FRANK | 910496010 | NEW | 01/22/75 | 796 |
| INDIANA UNIV.<br>INDIANAPOLIS | WATER<br>J.D./ENVRN. ENGR. | CAFOUROS, GREGORY P. | 910540010 | NEW | 03/14/75 | 6,500 |
| PURDUE UNIV.<br>WEST LAFAYETTE | WATER<br>M.S./ENVRN. ENGR. | REECE, CHRISTOPHER S. | 910572010 | NEW | 04/08/75 | 6,500 |

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| | I O W A | | | | | |
| ** RESEARCH ** | | | | | | |
| IOWA STATE UNIV.<br>AMES | WATER<br>MATH MODELS AS MGMT. TOOLS FOR AGRICULTURAL NON-POINT POLLUTION CONTROL | JOHNSON, HOWARD P. | 804102010 | NEW | 06/17/75 | 109,907 |
| ** TRAINING ** | | | | | | |
| ASSOCIATION OF BOARDS OF CERTIFICATION<br>AMES | WATER<br>CERTIFICATION EXAMINATION DEVELOPMENT PACKAGE (WATER & WASTEWATER) | SAUCIER, JOHN | 900541010 | NEW | 03/17/75 | 56,160 |
| ASSOCIATION OF BOARDS OF CERTIFICATION<br>AMES | WATER<br>ABC CERTIFICATION/TRAINING PROGRAM NEEDS INDENTIFICATION (H2O/WASTEWATER) | WUBBENA, ROBERT L. | 900661010 | NEW | 06/17/75 | 21,600 |
| ** FELLOWSHIPS ** | | | | | | |
| IOWA, UNIV. OF<br>IOWA CITY | WATER<br>M.S./ENVRN. ENGR. | JOHNSON, LYLE D. | 910533010 | NEW | 02/14/75 | 3,316 |
| IOWA, UNIV. OF<br>IOWA CITY | WATER<br>M.S./ENVRN. ENGR. | LIECHTY, DAVID W. | 910538010 | NEW | 02/19/75 | 3,316 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | K A N S A S | | | | | |
| ** RESEARCH ** | | | | | | |
| KANSAS STATE UNIV.<br>MANHATTAN | AIR<br>SOLID ABSORBENTS FOR SULFUR DIOXIDE | LAMBERT, JACK L. | 802849020 | CONT | 03/27/75 | 18,989 |
| KANSAS STATE UNIV.<br>MANHATTAN | WATER<br>APPLICATION OF CONTINUOUS WATERSHED MODELING TO FEEDLOT RUNOFF MGMT. | KOELLIKER, J. K. | 803797010 | NEW | 05/12/75 | 108,556 |
| KANSAS STATE UNIV.<br>MANHATTAN | WATER<br>DETERMINATION OF KINETICS OF PHOSPHORUS MINERALIZATION IN SOILS UNDER OXI | ELLIS, ROSCOE | 803936010 | NEW | 06/26/75 | 54,783 |
| ** TRAINING ** | | | | | | |
| KANSAS, UNIV. OF<br>LAWRENCE | WATER<br>TRAINING IN WATER SUPPLY & POLLUTION | O'BRIEN, WALTER J. | 900136063 | INCR | 04/29/75 | 29,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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## K E N T U C K Y

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| COUNCIL OF STATE GOVTS.<br>LEXINGTON | COMPREHENSIVE<br>STATE ROLE IN INTEGRATED ENVRN. PLANNING & MGMT. POLICIES | REEVES, H. CLYDE | 803171015 | INCR | 05/12/75 | 1,663 |
| KENTUCKY, UNIV. OF<br>LEXINGTON | PESTICIDES<br>METABOLISM OF CARBAMATE INSECTICIDES | DOROUGH, H. WYMAN | 802005060 | CONT | 01/06/75 | 39,525 |
| MURRAY STATE UNIV.<br>MURRAY | WATER<br>ID. CF ORGANIC COMPOUNDS IN TEXTILE PLANT EFFLUENTS | GORDON, MARSHALL | 802964020 | CONT | 02/03/75 | 35,000 |
| ** DEMONSTRATION ** | | | | | | |
| LEXINGTON-FAYETTE URBAN CNTY. GOVT.<br>LEXINGTON | COMPREHENSIVE<br>SOLID WASTE ENERGY PLANT FOR LEXINGTON-FAYETTE URBAN CNTY. GOVT. | HUNTER, DEAN D. | 804105010 | NEW | 06/30/75 | 50,000 |
| ** FELLOWSHIPS ** | | | | | | |
| EASTERN KENTUCKY UNIV.<br>RICHMOND | WATER | LOGAN, ROBERT W. | 910642010 | NEW | 05/21/75 | 6,500 |

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|  | L O U I S I A N A |  |  |  |  |  |
| ** RESEARCH ** |  |  |  |  |  |  |
| GULF SOUTH RES. INST.<br>BATON ROUGE | AIR<br>GLC DETECTOR FOR CARCINOGENIC HYDROCARBONS | GRANT, KENNETH M. | 800884064 | INCR | 01/20/75 | 1,114 |
|  |  |  | 800884065 | INCR | 05/15/75 | 40,000 |
| LOUISIANA STATE UNIV.<br>BATON ROUGE | AIR<br>DIRECT & CONTINUOUS DETERMINATION OF METALS IN AIR | ROBINSON, JAMES W. | 800771052 | INCR | 05/28/75 | 11,950 |
| LOUISIANA STATE UNIV.<br>BATON ROUGE | AIR<br>A STUDY OF NONCATALYTIC GAS-SOLID REACTION KINETICS | HARRISON, DOUGLAS P. | 802036030 | CONT | 06/02/75 | 25,861 |
| LOUISIANA STATE UNIV.<br>BATON ROUGE | WATER<br>NITROGEN & PHOSPHORUS REACTIONS IN OVERLAND FLOW OF WASTEWATER | PATRICK, WM. H. | 803612010 | NEW | 03/24/75 | 57,650 |
| LOUISIANA STATE UNIV. & A&M COLLEGE<br>BATON ROUGE | WATER<br>CARCINOGEN DETECTION IN WATER SUPPLIES & SOURCE BY MAMMALIAN CELL MONITOR | PELON, WILLIAM | 800188030 | CONT | 06/23/75 | 53,629 |
| LOUISIANA STATE UNIV. & A&M COLLEGE<br>BATON ROUGE | WATER<br>WATER QUALITY IMPROVEMENT THROUGH AERATION OF ANIMAL WASTE LAGOONS | CULLEY, DUDLEY D. | 803326010 | NEW | 05/28/75 | 99,939 |
| TULANE UNIV.<br>NEW ORLEANS | WATER<br>PERFORMANCE EVALUATION OF EXISTING COMBINED AERATED/FACULTATIVE LAGOON SY | ENGLANDE, A. J. | 803899010 | NEW | 06/23/75 | 88,767 |
| ** FELLOWSHIPS ** |  |  |  |  |  |  |
| TULANE UNIV.<br>NEW ORLEANS | WATER<br>M.S./PUBLIC HEALTH | MARTIN, KENNETH W. | 910614010 | NEW | 04/30/75 | 6,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | M A I N E | | | | | |
| ** RESEARCH ** | | | | | | |
| MAINE DEPT. OF MARINE RESOURCES<br>AUGUSTA | WATER<br>BIO-ACCUMULATION OF TRACE ELEMENTS IN SELECTED MARINE ORGANISMS | HURST, JOHN W. | 802656020 | CONT | 03/31/75 | 33,500 |
| ** DEMONSTRATION ** | | | | | | |
| BANGOR, CITY OF<br>BANGOR | SOLID WASTE<br>FEASIBILITY OF COMPOSTING RAW SEWAGE SLUDGE BY HIGH RATE SUCTION AERATION | JOSEPH, JOHN | 803828010 | NEW | 04/30/75 | 20,000 |
| ** FELLOWSHIPS ** | | | | | | |
| MAINE, UNIV. OF<br>ORONO | WATER<br>M.S./SAN. ENGR. | PALEN, DEAN N. | 910646010 | NEW | 05/13/75 | 6,000 |

## M A R Y L A N D

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| CHARLES CNTY. COMMUN. COLLEGE<br>LAPLATA | WATER<br>FIELD STUDY OF NUTRIENT CONTROL IN A MULTI-CELL LAGOON | SCHWING, CARL M. | 803637010 | NEW | 06/04/75 | 106,822 |
| JOHNS HOPKINS UNIV.<br>BALTIMORE | WATER<br>MICROORGANISMS IN STORMWATER | KRUSE, CORNELIUS W. | 802709016 | INCR | 04/30/75 | 40,000 |
| MARYLAND, UNIV. OF<br>COLLEGE PARK | AIR<br>OH REACTIONS OF IMPORTANCE ON PERTURBED TROPOSPHERE & TRACE GASES | DAVIS, DOUGLAS D. | 803131020 | CONT | 06/06/75 | 88,000 |
| MARYLAND, UNIV. OF<br>COLLEGE PARK | PESTICIDES<br>FIELD INVESTIGATION OF CHLORINATED & BROMINATED ORGANIC COMPOUNDS | HELY, GEORGE R. | 803839010 | NEW | 06/16/75 | 28,000 |
| NATIONAL COUNCIL RADIATION PROTECTION<br>BETHESDA | RADIATION<br>ASSESSMENT OF RADIATION LEVELS & HAZARDS | TAYLOR, LAURISTON S. | 802570020 | CONT | 04/16/75 | 35,000 |
| ** DEMONSTRATION ** | | | | | | |
| MARYLAND ENVRN. SERVICES<br>ANNAPOLIS | WATER<br>COMPOSTING SEWAGE SLUDGE | ALBRECHT, CLINTON | 803468010 | NEW | 06/02/75 | 478,345 |
| MARYLAND ENVRN. SERVICES<br>ANNAPOLIS | WATER<br>WASTE TREATMENT & DISPOSAL FROM SEAFOOD PROCESSING PLANTS | PHILLIPS, DOUGLAS | 803522010 | NEW | 01/29/75 | 36,000 |
| MARYLAND ENVRN. SERVICES<br>ANNAPOLIS | SOLID WASTE<br>MARYLAND WASTE OIL RECOVERY PROGRAM | UHRMACHER, J. CARL | 800650024 | INCR | 06/30/75 | 19,900 |
| WASHINGTON SUBURBAN SAN. COMM.<br>HYATTSVILLE | SOLID WASTE<br>EVALUATION OF THE UTILIZATION OF LIQUID SLUDGE ON SOD | MACHIS, ALFRED | 803976010 | NEW | 06/04/75 | 20,000 |
| ** TRAINING ** | | | | | | |
| CHARLES CNTY. COMMUN. COLLEGE<br>LAPLATA | WATER<br>TWO YEAR POST HIGH SCHOOL WASTEWATER TECHNOLOGY TRAINING PROGRAM | SCHWING, CARL M. | 900188050 | CONT | 06/16/75 | 25,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| M A R Y L A N D | | | | | | |
| ** TRAINING ** | | | | | | |
| CHARLES CNTY. COMMUN. COLLEGE<br>LA PLATA | WATER<br>EFFLUENT MONITORING PROCEDURES TRAINING PROGRAM | SCHWING, CARL M. | 900501012 | INCR | 05/07/75 | 40,000 |
| CHARLES CNTY. COMMUN. COLLEGE<br>LA PLATA | WATER<br>SUMMER TRAINING IN WATER & WASTEWATER | SCHWING, CARL M. | 900559010 | NEW | 06/12/75 | 3,531 |
| MARYLAND, UNIV. OF<br>COLLEGE PARK | WATER<br>FOUR-YEAR WATER & WASTEWATER TECHNOLOGY CURRICULUM DEVELOPMENT | WOCKENFUSS, WILLIAM | 900668010 | NEW | 06/17/75 | 30,000 |
| ** FELLOWSHIPS ** | | | | | | |
| JOHNS HOPKINS UNIV.<br>BALTIMORE | AIR<br>PH.D./ENVRN. ENGR./GEOGRAPHY | EATON, DAVID J. | 910359011 | INCR | 06/11/75 | 286 |
| JOHNS HOPKINS UNIV.<br>BALTIMORE | AIR<br>M.S./HEALTH SCI. | PINCKNEY, HAROLD | 910531010 | NEW | 05/23/75 | 6,350 |
| JOHNS HOPKINS UNIV.<br>BALTIMORE | WATER<br>M.S./WATER QUALITY | O'NEILL, DAVID J. | 910688010 | NEW | 06/23/75 | 1,905 |
| JOHNS HOPKINS UNIV.<br>BALTIMORE | WATER<br>M.A./SYSTEMS ANALYSIS & ECON. FOR PUBLIC DECISION MAKING/WATER RESOURCES | CLARK, JANICE R. | 910689010 | NEW | 06/16/75 | 1,850 |
| MARYLAND, UNIV. OF<br>COLLEGE PARK | WATER<br>PH.D./ENVRN. ENGR. | HEALY, RICHARD P. | 910647010 | NEW | 05/29/75 | 4,225 |
| TOWSON STATE COLLEGE<br>TOWSON | AIR<br>B.S./PUBLIC HEALTH | BUTANIS, JAMES F. | 910595010 | NEW | 05/28/75 | 637 |

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| HARVARD COLLEGE<br>CAMBRIDGE | WATER<br>IDENTIFICATION & DETECTION OF H2O-BORNE VIRUSED BY IMMUNOENZYMATIC METHOD | NICHOLS, ROGER L. | 803360010 | NEW | 02/28/75 | 50,000 |
| HARVARD UNIV.<br>BOSTON | AIR<br>HIGH VELOCITY-HIGH EFFICIENCY AEROSOL FILTRATION | FIRST, MELVIN W. | 801399023 | INCR | 06/30/75 | 43,900 |
| HARVARD UNIV.<br>CAMBRIDGE | WATER<br>ORGANIC N-CHLORO COMPOUNDS IN CHLORINATION OF WATER SUPPLIES | MORRIS, J. CARROLL | 803631010 | NEW | 03/05/75 | 36,787 |
| MASSACHUSETTS INST. OF TECH.<br>CAMBRIDGE | AIR<br>COMBUSTION RESEARCH ON COAL NITROGEN & PARTICULATE ORGANIC MATTER | HOWARD, JACK B. | 803242020 | CONT | 06/06/75 | 100,000 |
| MASSACHUSETTS INST. OF TECH.<br>CAMBRIDGE | WATER<br>TIDAL VARIATIONS OF WATER QUALITY PARAMETERS IN ESTUARINES | HARLEMAN, DONALD R. | 800429022 | INCR | 04/08/75 | 4,000 |
| MASSACHUSETTS INST. OF TECH.<br>CAMBRIDGE | WATER<br>CHEMICAL MODELING OF METALLIC WASTE DISPOSAL | MOREL, FRANCOIS M. | 803738010 | NEW | 05/05/75 | 25,000 |
| MASSACHUSETTS, UNIV. OF<br>AMHERST | WATER<br>SHORT COURSE ON APPLICATIONS OF STORMWATER MGMT. MODELS | DEGIANO, FRANCIS | 803069013 | INCR | 01/23/75 | 25,499 |
| MASSACHUSETTS, UNIV. OF<br>AMHERST | WATER<br>ZERO WASTEWATER DISCHARGE POTATO STARCH/PROTEIN PRODUCTION PROCESS | ROSENAU, JOHN R. | 803712010 | NEW | 06/06/75 | 38,800 |
| NEW ENGLAND MEDICAL CTR. HOSPITAL<br>BOSTON | WATER<br>RELATIONSHIP OF BLOOD LEAD LEVELS TO LEAD IN HOUSEHOLD DRINKING WATER | WORTH, DOROTHY J. | 802794013 | INCR | 03/27/75 | 13,041 |
| SOUTHEASTERN MASSACHUSETTS UNIV.<br>N. DARTMOUTH | WATER<br>DEVELOPMENT OF INTERACTIVE SYSTEM TO STUDY SUB-LETHAL EFFECT OF POLLUTANT | GREAVER, JOHN O. B. | 803244020 | CONT | 05/19/75 | 63,078 |
| WOODS HOLE OCEANOGRAPHIC INST.<br>WOODS HOLE | WATER<br>QUANTITATIVE ANALYSIS OF THE CAPE CODE BAY ECOSYSTEM | MICHAEL, ALLAN D. | 800656016 | INCR | 02/14/75 | 5,071 |

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| ** RESEARCH ** | | | | | | |
| WOODS HOLE OCEANOGRAPHIC INST.<br>WOODS HOLE | WATER<br>PETROLEUM CONTAMINATION: QUANTIFICATION & PASSIVE TAGGING IN ORGANISMS | FARRINGTON, JOHN | 802724020 | CONT | 01/03/75 | 50,524 |
| | | | 802724023 | INCR | 06/27/75 | 19,519 |
| ** DEMONSTRATION ** | | | | | | |
| MARBLEHEAD, TOWN OF<br>MARBLEHEAD | SOLID WASTE<br>DEMONSTRATION OF MULTI-MATERIAL SOURCE SEPARATION | REED, RAYMOND A. | 803758010 | NEW | 05/23/75 | 77,564 |
| SOMERVILLE, CITY OF<br>SOMERVILLE | SOLID WASTE<br>DEMO. OF MULTI-MATERIAL SOURCE SEPARATION IN AN URBAN AREA | REILLY, DAVID | 803683010 | NEW | 05/20/75 | 121,698 |
| ** TRAINING ** | | | | | | |
| BOSTON COLLEGE<br>WESTON | AIR<br>NEW ENGLAND CONSORTIUM ON ENVRN. PROTECTION | FLAHERTY, CHARLES F. | 900546010 | NEW | 06/30/75 | 129,741 |
| HARVARD COLLEGE<br>CAMBRIDGE | AIR<br>TRAINING PROGRAM IN AIR POLLUTION | MOELLER, DADE W. | 900547010 | NEW | 06/02/75 | 61,717 |
| MASSACHUSETTS INST. OF TECH.<br>CAMBRIDGE | WATER<br>WATER QUALITY SYSTEMS MODELING & MGMT. | HARLEMAN, DONALD R. | 900160042 | INCR | 06/25/75 | 48,204 |
| ** FELLOWSHIPS ** | | | | | | |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./LANDSCAPE ARCHITECTURE | BROOKS, JANE | 910463010 | NEW | 05/12/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | DICKSTEIN, DENNIS I. | 910532010 | NEW | 05/29/75 | 6,493 |

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| | M A S S A C H U S E T T S | | | | | |
| ** FELLOWSHIPS ** | | | | | | |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./REGIONAL PLANNING | KRINZMAN, ALLAN N. | 910553010 | NEW | 06/02/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | WUEBBEN, PAUL D. | 910555010 | NEW | 05/29/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./LANDSCAPE ARCHITECTURE | REINIGER, CLAIR W. | 910564010 | NEW | 06/06/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | FLYNN, THOMAS J. | 910575010 | NEW | 06/06/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./REGIONAL PLANNING | ROCHE, MARISSA T. | 910576010 | NEW | 06/02/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | HOFFMAN, ANN E. | 910578010 | NEW | 05/09/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | HELD, KARL F. | 910583010 | NEW | 05/19/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | MISCHEL, HOWARD D. | 910592010 | NEW | 06/02/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | YARO, ROBERT D. | 910596010 | NEW | 06/02/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | GRAHAME, THOMAS J. | 910603010 | NEW | 05/12/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | MELISH, DIANE C. | 910610010 | NEW | 06/02/75 | 6,493 |

## MASSACHUSETTS

** FELLOWSHIPS **

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| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./CITY PLANNING | PELHAM, EUGENE T. | 910635010 | NEW | 05/14/75 | 6,493 |
| HARVARD UNIV.<br>CAMBRIDGE | AIR<br>M.S./REGIONAL PLANNING | DONAHUE, ELLEN C. | 910639010 | NEW | 06/02/75 | 6,493 |
| MASSACHUSETTS INST. OF TECH.<br>CAMBRIDGE | AIR<br>M.S./MANAGEMENT | SPIRO, HARVEY J. | 910597010 | NEW | 05/21/75 | 8,825 |
| MASSACHUSETTS, UNIV. OF<br>AMHERST | AIR<br>M.S./ENVRN. ENGR. | LUNDERVILLE, DENNIS R. | 910530010 | NEW | 05/15/75 | 8,310 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./AIR POLLUTION/ENVRN. ENGR. | MOLLOY, EDWARD J. | 910379011 | INCR | 04/22/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR./ENVRN./AIR POLLUTION | BOISSELLE, ROBERT A. | 910381011 | INCR | 04/22/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR. | CAPONE, STEPHEN V. | 910382011 | INCR | 04/29/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./ENVRN. ENGR./AIR POLLUTION | KRUPKA, MICHAEL S. | 910385011 | INCR | 04/29/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./ENVRN. ENGR./AIR POLLUTION | MAHER, MICHAEL J. | 910387011 | INCR | 04/30/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./ENVRN. ENGR./AIR POLLUTION | OI, ALLEN W. | 910388011 | INCR | 04/29/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR./AIR POLLUTION | REDCAY, AARON K. | 910390011 | INCR | 04/30/75 | 1,294 |

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| ** FELLOWSHIPS ** | | | | | | |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR./AIR POLLUTION | ROECK, DOUGLAS R. | 910391011 | INCR | 04/22/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./ENVRN. ENGR./AIR POLLUTION | SWIBLE, GEORGE M. | 910392011 | INCR | 04/22/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR. | KASHINSKY, NORA M. | 910393011 | INCR | 04/23/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./ENVRN. ENGR./AIR POLLUTION | MCINNES, ROBERT J. | 910397011 | INCR | 04/22/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR./AIR POLLUTION | KELLER, RICHARD W. | 910412011 | INCR | 04/22/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./CIVIL ENGR. | CHALPIN, RICHARD J. | 910421011 | INCR | 05/19/75 | 1,294 |
| NORTHEASTERN UNIV.<br>BOSTON | AIR<br>M.S./ENVRN. ENGR. | SILVERSTEIN, IRWIN | 910630010 | NEW | 05/21/75 | 7,695 |

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| AMERICAN SOCIETY OF AGRI. ENGR.<br>ST. JOSEPH | WATER<br>INTERNATIONAL SYMPOSIUM ON LIVESTOCK WASTES - 1975 | HAHN, RUSSELL H. | 803699010 | NEW | 03/13/75 | 2,000 |
| CRANBROOK INST. OF SCIENCE<br>BLOOMFIELD HILL | WATER<br>UPPER LAKES REFERENCE STUDY:SURVEY OF CHEM. & BIO. FACTORS IN SAGINAW BAY | SMITH, V. ELLIOT | 802685022 | INCR | 04/22/75 | 23,053 |
| | | | 802685030 | CONT | 05/29/75 | 126,941 |
| DETROIT, UNIV. OF<br>DETROIT | WATER<br>STUDY OF INDICATOR GROUP OF BACTERIA FOR HUMAN FECAL POLLUTION | NUNEZ, WILLIAM J. | 803659010 | NEW | 06/06/75 | 28,000 |
| MICHIGAN ENVRN. RES. INST.<br>ANN ARBOR | WATER<br>CLADOPHORA MEASUREMENTS USING REMOTE SENSING | WEZERNAK, CHESTER T. | 803611010 | NEW | 06/26/75 | 32,651 |
| MICHIGAN ENVRN. RES. INST.<br>ANN ARBOR | WATER<br>TRANS-BOUNDARY MOVEMENT OF POLLUTANTS | WEZERNAK, CHESTER T. | 803671010 | NEW | 05/14/75 | 9,982 |
| MICHIGAN ENVRN. RES. INST.<br>ANN ARBOR | COMPREHENSIVE<br>PROPOSAL FOR SUPPORT OF THE CTR. FOR REMOTE SENSING INFORMATION &ANALYSIS | COOK, JERALD J. | 803229020 | CONT | 06/27/75 | 5,000 |
| MICHIGAN STATE UNIV.<br>EAST LANSING | WATER<br>NITRATE & PHOSPHORUS RUNOFF LOSSES FROM A WATERSHED IN GREAT LAKES BASIN | ELLIS, BOYD G. | 802974020 | CONT | 02/26/75 | 22,897 |
| MICHIGAN STATE UNIV.<br>EAST LANSING | PESTICIDES<br>RESISTANCE HAZARD OF JUVENILE HORMONE MIMICS | BROWN, A. W. A. | 803124020 | CONT | 05/15/75 | 28,609 |
| MICHIGAN STATE UNIV.<br>EAST LANSING | PESTICIDES<br>UTILIZATION OF PEST ECOSYSTEM MODELS IN PEST MANAGEMENT PROGRAMS | HOFFMAN, JOHN W. | 803785010 | NEW | 05/20/75 | 68,346 |
| MICHIGAN STATE UNIV.<br>EAST LANSING | PESTICIDES<br>ECOSYSTEM RESPONSE TO ALTERNATIVE PESTICIDES IN ENVRN: A SYSTEMS APPROACH | BROWN, A. W. A. | 803859010 | NEW | 06/16/75 | 120,000 |

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| MICHIGAN STATE UNIV.<br>EAST LANSING | COMPREHENSIVE<br>MASS TRANSPORT OF BIOLOGICAL MATERIALS THRU A ONCE-THRU COOLING SYSTEM | BALL, ROBERT C. | 801188031 | INCR | 05/23/75 | 33,695 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | AIR<br>PERMEATION TUBE SOURCES FOR NOX & CO STANDARDS | STEDMAN, DONALD | 802373020 | NEW | 01/22/75 | 20,000 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | AIR<br>THE ROLE OF FUEL DROP SIZE & DISTRIBUTION IN GAS TURBINE COMBUSTORS | NICHOLLS, J.A. | 802925020 | CONT | 06/17/75 | 77,476 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | AIR<br>LONG PATH AIR POLLUTION MONITOR EVALUATION | BARTMAN, FREDERICK | 803399011 | INCR | 04/08/75 | 10,000 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | AIR<br>GASEOUS EMISSIONS FROM UNREGULATED MOBILE SOURCES | HECKER, LAWRENCE H. | 803568010 | NEW | 06/30/75 | 25,137 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | WATER<br>USE OF NUTRIENT BIOASSAY PROCEDURES IN THE GREAT LAKES | SCHELSKE, CLAIRE L. | 800965022 | INCR | 05/12/75 | 88,000 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | WATER<br>BIOLOGICAL RESPONSES TO EUTROPHICATION IN SAGINAW BAY & LAKE HURON | STOERMER, EUGENE F. | 802780021 | INCR | 03/03/75 | 26,500 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | WATER<br>CHARACTERISTICS OF BENTHIC ALGAL COMMUNITIES IN THE UPPER GREAT LAKES | STOERMER, EUGENE | 803037011 | INCR | 03/10/75 | 30,000 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | WATER<br>STUDY OF THE ION EXCHANGE PROCESS FOR NITRATE REMOVAL FROM WATER SUPPLIES | WEBER, WALTER J. | 803898010 | NEW | 06/17/75 | 44,654 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | PESTICIDES<br>METABOLIC INTERACTIONS OF HORMONAL STEROIDS & CHLORINATED HYDROCARBONS | MASON, MERLE | 800637030 | CONT | 01/28/75 | 7,590 |
| OIL SPILL CONTROL ASSOC. OF AMERICA<br>SOUTHFIELD | WATER<br>THIRD NATIONAL CONFERENCE ON CONTROL OF HAZARDOUS MATERIAL SPILLS | USHER, DAVID | 803923010 | NEW | 05/05/75 | 22,000 |

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| ** DEMONSTRATION ** | | | | | | |
| BELDING, CITY OF<br>BELDING | WATER<br>BELDING, MICHIGAN SPRAY IRRIGATION SEWAGE OXIDATION POND EFFLUENT | MENDENHALL, KENNETH N. | 803807015 | INCR | 05/07/75 | 61,000 |
| WYOMING, CITY OF<br>WYOMING | WATER<br>PARALLEL OZONATION & CHLORINATION W/ DECHLORINATION OF CHLORINATED EFFLUE | SHEERAN, JAMES A. | 80229201A | INCR | 06/24/75 | 49,818 |
| | | | 802292017 | INCR | 03/20/75 | 7,000 |
| ** TRAINING ** | | | | | | |
| MICHIGAN STATE UNIV.<br>E. LANSING | WATER<br>TRAINING IN WATER/WASTEWATER/MID LEVEL MANAGERS | DEHAVEN, CLARK E. | 900219015 | INCR | 06/06/75 | 31,280 |
| ** FELLOWSHIPS ** | | | | | | |
| DETROIT INST. OF TECH.<br>DETROIT | AIR<br>B.S./ELECTRONIC ENGR. | CLEAGE, ROLAND A. | 910672010 | NEW | 06/26/75 | 730 |
| MICHIGAN STATE UNIV.<br>EAST LANSING | WATER<br>M.S./CHIRONOMID SYSTEMATICS & ECOLCGY | JACKSON, GEORGE A. | 910447011 | INCR | 06/11/75 | 1,840 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | AIR<br>PH.D./ENVRN. HEALTH SCIENCES | STAPLETON, CARL R. | 910371011 | INCR | 03/20/75 | 600 |
| MICHIGAN, UNIV. OF<br>ANN ARBOR | WATER<br>M.S./NATURAL RESOURCES POLICY & MGMT. | REEVES, THOMAS G. | 910653010 | NEW | 06/04/75 | 2,820 |

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| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>SAMPLING & ANALYSIS OF ATMOSPHERIC AEROSOLS | WHITBY, KENNETH J. | 800971033 | INCR | 03/20/75 | 110,230 |
| MINNESOTA, UNIV. OF<br>DULUTH | WATER<br>CHLORINATION & OZONATION PRODUCTS FROM WASTEWATER RENOVATION | CARLSON, ROBERT M. | 800675032 | INCR | 03/06/75 | 15,000 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | WATER<br>EFFECT OF CYANIDE ON FRESHWATER FISH & INVERTEBRATES | SMITH, LLOYD L. | 802914020 | CONT | 02/03/75 | 98,658 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | WATER<br>DEVELOP METHODS TO SEPARATE SEDIMENTS FROM STORM WATER OF CONSTRUCTION | ANDERSON, ALVIN G. | 803579010 | NEW | 02/28/75 | 80,723 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | WATER<br>WATER TEMPERATURE STUDIES AT THE MONTICELLO FIELD STATION | STEFAN, H. | 803686010 | NEW | 06/26/75 | 17,732 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | WATER<br>BIOMANIPULATION- AN ECOSYSTEM TO LAKE RESTORATION | SHAPIRO, JOSEPH | 803870010 | NEW | 06/25/75 | 45,374 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | WATER<br>CONTINUOUS FLOW BIOASSAYS USING NATURAL PERIPHYTON COMMUN. WITH EMPHASIS | GERHART, DAVID Z. | 803932010 | NEW | 06/24/75 | 40,091 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | COMPREHENSIVE<br>FORMATION OF ATMOSPHERIC AEROSOLS | WHITBY, KENNETH T. | 803851010 | NEW | 06/25/75 | 135,000 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | COMPREHENSIVE<br>CASE STUDY OF METRO. COUNCIL AS AN ENVRN. MGMT. ORGANIZATION | GLEESON, MICHAEL E. | 803906010 | NEW | 06/06/75 | 24,992 |
| MINNESOTA, UNIV. OF<br>DULUTH | COMPREHENSIVE<br>ORGANIC LEACHING & PARTICULATE DISPERSION FROM COAL | CAPLE, RONALD | 803952010 | NEW | 06/13/75 | 70,000 |
| TWIN CITIES METRO. WASTE CONTROL COMM.<br>ST. PAUL | WATER<br>CO-INCINERATION OF SEWAGE SLUDGE WITH REFUSE &/OR COAL | BERGSTEDT, DALE C. | 803927010 | NEW | 06/23/75 | 372,622 |

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| ** DEMONSTRATION ** | | | | | | |
| CHERNE INDUSTRIAL, INC.<br>EDINA | COMPREHENSIVE<br>RESEARCH DEMONSTRATION OF THE CHERNE THERMAL ROTOR, A LARGE SCALE TEST | BOLER, L. JOSEPH | 803690010 | NEW | 06/20/75 | 50,000 |
| ELY, CITY OF<br>ELY | WATER<br>LAKE RESTORATION BY PHOSPHORUS CONTROL | GRADHEK, J. P. | 802309018 | INCR | 01/03/75 | 149,858 |
| MINNESOTA POLLUTION CONTROL AGENCY<br>ROSEVILLE | SOLID WASTE<br>CHEMICAL WASTE LAND FILL DISPOSAL DEMONSTRATION GRANT | SILVAGNI, ROBERT | 803744010 | NEW | 05/07/75 | 418,984 |
| NORTHERN STATES POWER CO.<br>MINNEAPOLIS | COMPREHENSIVE<br>BENEFICIAL USES OF WARM WATER FROM CONDENSER OF ELECTRIC GENERATING PLANT | STANSFIELD, RUSSELL V. | 803770010 | NEW | 04/29/75 | 250,000 |
| ST. PAUL METRO. SEWER BD.<br>ST. PAUL | WATER<br>PROCESS AUTOMATION EVALUATION | POLTA, ROBERT C. | 803602010 | NEW | 04/21/75 | 90,000 |
| ** FELLOWSHIPS ** | | | | | | |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>PH.D./AIR QUALITY MGMT. PLANNING | THRON, RAYMOND W. | 910122021 | INCR | 01/23/75 | 4,800 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>ENVRN. HEALTH SCIENCE | BROUETTE, TODD | 910337011 | INCR | 01/16/75 | 50 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>M.S./PUBLIC HEALTH/AIR POLLUTION | KIECKER, GLEN D. | 910403011 | INCR | 01/17/75 | 50 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>PUBLIC HEALTH | MONSON, RAYMOND E. | 910521010 | NEW | 05/23/75 | 7,962 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>PH.D./PUBLIC HEALTH | RITCHIE, INGRID M. | 910550010 | NEW | 05/28/75 | 876 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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## M I N N E S O T A

** FELLOWSHIPS **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>M.S./PUBLIC HEALTH | SHEPHERD, HOMER E. | 910561010 | NEW | 05/21/75 | 9,120 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>M.S./PUBLIC HEALTH | OBERTA, ANDREW F. | 910562010 | NEW | 06/02/75 | 6,220 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>M.S./PUBLIC HEALTH | MEYERDIERKS, JUDITH A. | 910565010 | NEW | 05/19/75 | 7,962 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>M.S./ENVRN. HEALTH | WHEAR, THOMAS C. | 910573010 | NEW | 05/23/75 | 6,765 |
| MINNESOTA, UNIV. OF<br>MINNEAPOLIS | AIR<br>M.S./ENVRN. HEALTH | TAKEMOTO, LYNNE E. | 910627010 | NEW | 05/29/75 | 5,062 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | M I S S I S S I P P I | | | | | |
| ** RESEARCH ** | | | | | | |
| ALCORN STATE UNIV.<br>LORMAN | COMPREHENSIVE<br>OVERLAND RECYCLING SYSTEM FOR ANIMAL WASTE TREATMENT | GRIER, HAROLD E. | 802336020 | CONT | 03/18/75 | 42,525 |
| GULF COAST RES. LAB.<br>OCEAN SPRINGS | PESTICIDES<br>INSECTICIDE PERSISTENCE IN SEAWATER AS AFFECTED BY SALINITY & LIGHT | WALKER, WILLIAM W. | 803842010 | NEW | 05/15/75 | 22,135 |
| MISSISSIPPI STATE UNIV.<br>MISSISSIPPI STAT | PESTICIDES<br>SEX PHEROMONES & BEHAVIOR STUDIES OF THE PECAN WEEVIL CURCULIO CARYAE | NEEL, W. W. | 802659030 | CONT | 05/15/75 | 24,200 |
| SOUTHERN MISSISSIPPI, UNIV. OF<br>HATTIESBURG | WATER<br>FATE & IMPACT OF PENTACHLOROPHENOL IN A FRESHWATER ECOSYSTEM | PIERCE, RICHARD H. | 803820010 | NEW | 06/12/75 | 24,372 |
| ** TRAINING ** | | | | | | |
| MISSISSIPPI VALLEY STATE UNIV.<br>ITTA BENA | WATER<br>WASTEWATER TREATMENT PLANT PERSONNEL TRAINING PROGRAM | SETHI, S. L. | 900530010 | NEW | 03/27/75 | 19,848 |
| ** FELLOWSHIPS ** | | | | | | |
| MISSISSIPPI STATE UNIV.<br>MISSISSIPPI STAT | AIR<br>M.S./MECH. ENGR. | HARDISON, EUGENE P. | 910623010 | NEW | 05/14/75 | 897 |
| MISSISSIPPI STATE UNIV.<br>MISSISSIPPI STAT | AIR<br>M.S./ENGR. | KENNEDY, GEORGE M. | 910641010 | NEW | 05/15/75 | 897 |
| MISSISSIPPI STATE UNIV.<br>MISSISSIPPI STAT | WATER<br>M.S./SAN. ENGR. | WYLIE, DWIGHT K. | 910529010 | NEW | 02/11/75 | 3,060 |
| MISSISSIPPI STATE UNIV.<br>MISSISSIPPI STAT | WATER<br>M.S./ENVRN. ENGR. | SEYFARTH, ROBERT H. | 910678010 | NEW | 06/24/75 | 6,200 |
| SOUTHERN MISSISSIPPI, UNIV. OF<br>HATTIESBURG | AIR<br>M.S./ENVRN. SCI. | BURKE, ROBERT D. | 910547010 | NEW | 06/26/75 | 7,494 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | M I S S O U R I | | | | | |
| ** RESEARCH ** | | | | | | |
| MIDWEST RES. INST.<br>KANSAS CITY | WATER<br>CONFERENCE ON AGRICULTRUAL WATER POLLUTION CONTROL | CHAPPLOW, CECIL C. | 803729010 | NEW | 02/20/75 | 6,000 |
| MISSOURI, UNIV. OF<br>COLUMBIA | PESTICIDES<br>BIONOMICS & MANAGEMENT OF SOIL ARTHROPOD PESTS | FAIRCHILD, MAHLON L. | 802547030 | CONT | 05/19/75 | 300,000 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>DYNAMICS OF URBAN AEROSOLS | HUSAR, RUDALF B. | 802815016 | INCR | 01/07/75 | 36,618 |
| | | | 802815018 | INCR | 03/25/75 | 54,823 |
| | | | 802815020 | CONT | 06/18/75 | 31,481 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>SYSTEM FOR ON LINE MEASUREMENT OF AEROSOL SIZE DISTRIBUTION & MASS | HUSAR, RUDOLPH B. | 803115020 | CONT | 05/14/75 | 45,000 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>SULFUR BUDGET IN LARGE PLUMES | HUSAR, R. B. | 803896010 | NEW | 06/17/75 | 150,000 |
| ** DEMONSTRATION ** | | | | | | |
| MISSOURI, UNIV. OF<br>COLUMBIA | WATER<br>PROCESSING OF POULTRY BY-PRODUCTS FOR THE ELIMINATION OF POLLUTANTS | VANDEPOPULIERE, J. M. | 803614010 | NEW | 02/05/75 | 16,483 |
| ST. LOUIS, CITY OF<br>ST. LOUIS | SOLID WASTE<br>USE OF REFUSE AS SUPPLEMENTARY FUELS IN BOILER FURNACES | SUTTERFIELD, WAYNE | 802255034 | INCR | 03/20/75 | 26,024 |
| ** TRAINING ** | | | | | | |
| MISSOURI, UNIV. OF<br>ROLLA | WATER<br>WATER POLLUTION CONTROL IN MINERAL ENGR. | WARNER, DON L. | 900056041 | INCR | 04/29/75 | 22,879 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | MISSOURI | | | | | |
| ** TRAINING ** | | | | | | |
| MISSOURI, UNIV. OF<br>COLUMBIA | WATER<br>TRAINING IN WATER SUPPLY & POLLUTION CONTROL | GRIGOPOULOS, SOTIRIOS G | 900121042 | INCR | 04/08/75 | 8,013 |
| WATER & WASTEWATER TECH. SCH.<br>NEOSHO | WATER<br>ADVANCED OPERATOR TRAINING OF TRANSITION PROGRAM VETERANS | LAYTON, RONALD F. | 900489011 | INCR | 03/27/75 | 8,080 |
| WATER & WASTEWATER TECH. SCH.<br>NEOSHO | WATER<br>SPECIALIZED TRAINING PROGRAM FOR FEDERAL & STATE PERSONNEL | LAYTON, RONALD F. | 900507011 | INCR | 03/24/75 | 61,612 |
| WATER & WASTEWATER TECH. SCH.<br>NEOSHO | WATER<br>NPDES EFFLUENT MONITORING TRAINING | LAYTON, RONALD F. | 900512012 | INCR | 03/20/75 | 23,360 |
| ** FELLOWSHIPS ** | | | | | | |
| MISSOURI, UNIV. OF<br>COLUMBIA | WATER<br>M.S./SAN. ENGR. | BECKER, HARRY R. | 910450011 | INCR | 04/18/75 | 3,580 |
| | | | 910450012 | INCR | 06/10/75 | 2,920 |
| MISSOURI, UNIV. OF<br>COLUMBIA | WATER<br>M.S./INDUSTRIAL ENGR. | DAVIS, ROBERT W. | 910643010 | NEW | 05/09/75 | 3,572 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>M.S./AIR POLLUTION | PATTERSON, DAVID E. | 910581010 | NEW | 05/19/75 | 1,840 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>M.S./AIR POLLUTION SCIENCE | GAJJAR, ASHVIN G. | 910590010 | NEW | 05/21/75 | 1,840 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>M.S./AIR POLLUTION ENGR. & SCIENCE | FRANKE, WALTER H. | 910591010 | NEW | 05/19/75 | 1,930 |

| APPLICANT<br>MUNICIPALITY | MECIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | M I S S O U R I | | | | |
| ** FELLOWSHIPS ** | | | | | | |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>M.S./CHEM. ENGR. | FARLEY, MICHAEL L. | 910602010 | NEW | 05/19/75 | 1,840 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>M.S./AIR POLLUTION ENGR. | PALEY, CYNTHIA G. | 910655010 | NEW | 05/21/75 | 1,840 |
| WASHINGTON UNIV.<br>ST. LOUIS | AIR<br>M.S./ENGR. MGMT. | HORSFORD, WILLIAM C. | 910662010 | NEW | 06/02/75 | 1,840 |
| WASHINGTON UNIV.<br>ST. LOUIS | WATER<br>M.S./ENVRN. ENGR. | MERZ, ERIC W. | 910664010 | NEW | 05/29/75 | 2,560 |

## M O N T A N A

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| MONTANA STATE UNIV.<br>BOZEMAN | WATER<br>CONCENTRATIONS OF AMMONIA TOXIC TO FISHES | THURSTON, ROBERT V. | 800861043 | INCR | 03/20/75 | 27,100 |
| | | | 800861044 | INCR | 06/27/75 | 35,000 |
| MONTANA STATE UNIV.<br>BOZEMAN | WATER<br>COOPERATIVE PROGRAM TO EVALUATE WATER PROBLEMS AT STRIP MINE SITES | WILLIAMS, THEODORE T. | 803727010 | NEW | 06/02/75 | 629,541 |
| MONTANA STATE UNIV.<br>BOZEMAN | COMPREHENSIVE<br>USE OF LICHENS AS INDICATORS & PRECICTORS OF POLLUTION | EVERSMAN, SHARON | 803213020 | CONT | 06/24/75 | 10,085 |
| MONTANA STATE UNIV.<br>BOZEMAN | COMPREHENSIVE<br>MONITORING PLANT COMMUNITY CHANGES DUE TO FOSSIL FUEL POWER PLANTS | TAYLOR, J. E. | 803322020 | CONT | 06/23/75 | 55,918 |
| NORTHERN CHEYENNE TRIBAL COUNCIL<br>LAME DEER | COMPREHENSIVE<br>IMPACT TO GROUND & SURFACE WATER QUALITY & QUANTITY FROM PROPOSED ENERGY | BAILEY, ROBERT | 803566010 | NEW | 05/02/75 | 275,148 |
| ** DEMONSTRATION ** | | | | | | |
| MONTANA DEPT.NATURAL RESOURCES&CONSERV<br>HELENA | WATER<br>HUGHESVILLE, MONTANA, ACID MINE DEMONSTRATION PROJECT | BONDY, RICHARD L. | 803822010 | NEW | 06/06/75 | 106,887 |
| MONTANA STATE UNIV.<br>BOZEMAN | WATER<br>EFFECTS OF SURFACE CONFIGURATION IN WPC ON SEMIARID MINED LANDS | HODDER, RICHARD L. | 803079020 | CONT | 06/20/75 | 526,317 |
| ** FELLOWSHIPS ** | | | | | | |
| MONTANA STATE UNIV.<br>BOZEMAN | WATER<br>M.S./AGRI. ENGR. | SCHWINDT, FRANCIS J. | 910593010 | NEW | 04/21/75 | 6,500 |
| MONTANA STATE UNIV.<br>BOZEMAN | WATER<br>M.S./INDUSTRIAL ENGR. | KARP, RICHARD W. | 910626010 | NEW | 05/02/75 | 6,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| M O N T A N A | | | | | | |
| ** FELLOWSHIPS ** | | | | | | |
| MONTANA STATE UNIV.<br>BOZEMAN | WATER<br>M.S./MICROBIOLOGY | STUART, SIDNEY A. | 910687010 | NEW | 06/17/75 | 1,144 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | N E B R A S K A | | | | |
| ** DEMONSTRATION ** | | | | | | |
| L. P. SCHRAM FEED LOT, INC.<br>PAPILLION | WATER<br>BEEF FEEDLOT WASTE MGMT. SYSTEM | SCHRAM, LARRY P. | 802197014 | INCR | 04/04/75 | 32,100 |
| ** FELLOWSHIPS ** | | | | | | |
| NEBRASKA, UNIV. OF<br>LINCOLN | AIR<br>MECHANICAL ENGR. & AIR POLLUTION | GRAMS, DENNIS D. | 910271013 | INCR | 01/16/75 | 2,852 |
| NEBRASKA, UNIV. OF<br>LINCOLN | AIR<br>APC/ENVRN. HEALTH | NELSON, JOHN M. | 910522010 | NEW | 01/22/75 | 821 |
| NEBRASKA, UNIV. OF<br>LINCOLN | WATER<br>M.S./SAN. ENGR. | BUHRMAN, RONALD C. | 910558010 | NEW | 06/11/75 | 1,706 |

## NEW HAMPSHIRE

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** FELLOWSHIPS ** | | | | | | |
| NEW HAMPSHIRE, UNIV. OF<br>DURHAM | WATER<br>M.S./CIVIL ENGR. | KITTREDGE, DAVID | 910506010 | NEW | 01/17/75 | 5,085 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | N E W J E R S E Y | | | | | |
| ** RESEARCH ** | | | | | | |
| AMERICAN ELECTROPLATERS' SOCIETY, INC.<br>EAST ORANGE | WATER<br>MEMBRANE PROCESSES FOR TREATING METAL FINISHING WASTES | SCHUMACHER, J. HOWARD | 800945023 | INCR | 01/06/75 | 12,825 |
| AMERICAN ELECTROPLATERS' SOCIETY, INC.<br>EAST ORANGE | WATER<br>DEV. OF HIGH-TEMP., OXIDATION-RESISTANT OSMOSIS MEMBRANE | LEAL, JOSEPH R. | 803620010 | NEW | 02/11/75 | 23,750 |
| AMERICAN ELECTROPLATERS' SOCIETY, INC.<br>EAST ORANGE | WATER<br>MEMBRANE PROCESSES FOR TREATING METAL FINISHING WASTES | SCHUMACHER, J. H. | 803753010 | NEW | 04/30/75 | 27,175 |
| EXXON RESEARCH & ENGINEERING CO.<br>LINDEN | WATER<br>STATE-OF-THE-ART STUDY OF LANDFILL IMPOUNDMENT TECHNIQUES | STEWART, W. S. | 803585010 | NEW | 02/05/75 | 24,906 |
| NEWARK COLLEGE<br>NEWARK | WATER<br>EVALUATE ABSORBANTS FOR REMOVAL OF CONTAMINANTS DURING DISPOSAL OF SLUDGE | LISKOWITZ, JOHN | 803717010 | NEW | 04/29/75 | 25,000 |
| NEWARK COLLEGE OF ENGR.<br>NEWARK | AIR<br>FIELD INSTRUMENT FOR ON-STACK MONITORING PARTICULATES IN STACK EMISSION | LISKOWITZ, JOHN | 803509010 | NEW | 01/22/75 | 39,000 |
| RUTGERS STATE UNIV.<br>NEW BRUNSWICK | WATER<br>REVIEW & ANALYSIS OF OIL/WATER SEPARATION LITERATURE | AHLERT, ROBERT C. | 803978010 | NEW | 06/16/75 | 9,966 |
| RUTGERS STATE UNIV.<br>NEW BRUNSWICK | SOLID WASTE | FLOWER, FRANKLIN B. | 803762010 | NEW | 04/25/75 | 64,956 |
| RUTGERS UNIV.<br>NEW BRUNSWICK | WATER<br>ACTINOMYCETES OF SEWAGE-TREATMENT PLANTS | LECHEVALIER, HUBERT A. | 803701010 | NEW | 03/25/75 | 27,870 |
| RUTGERS UNIV.<br>NEW BRUNSWICK | SOLID WASTE<br>RESEARCH SYMPOSIUM /GAS & LEACHATE FROM LANDFILLS: COLLECTION & FORMATION | KAPLOVSKY, JOEL A. | 803663010 | NEW | 02/03/75 | 19,688 |
| ** DEMONSTRATION ** | | | | | | |
| MIDDLESEX CNTY. BD. CHOSEN FREEHOLDERS<br>NEW BRUNSWICK | COMPREHENSIVE<br>ENERGY RECOVERY IMPLEMENTATION PROGRAM | O'NEILL, THEODORE F. | 804068010 | NEW | 06/30/75 | 50,000 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | N E W  J E R S E Y | | | | |
| ** DEMONSTRATION ** | | | | | | |
| OCEAN CNTY. SEWERAGE AUTH.<br>TOMS RIVER | WATER<br>WASTEWATER SOLIDS UTILIZATION ON THE LAND | SIMPSON, LAWRENCE | 801871012 | INCR | 05/02/75 | 100,000 |
| ** TRAINING ** | | | | | | |
| RUTGERS STATE UNIV.<br>NEW BRUNSWICK | AIR<br>AIR RESOURCES MANAGEMENT & TRAINING PROGRAM | KAPLOVSKY, A. JOEL | 900553010 | NEW | 05/29/75 | 58,597 |
| ** FELLOWSHIPS ** | | | | | | |
| COOK COLLEGE/RUTGERS UNIV.<br>NEW BRUNSWICK | AIR<br>M.S./ENVRN. SCIENCE | DIGENOVA, FRANCIS J. | 910609010 | NEW | 05/19/75 | 808 |
| RUTGERS UNIV.<br>NEW BRUNSWICK | AIR<br>M.S./ENVRN. SCI. | GOETZ, SUSAN J. | 910671010 | NEW | 06/20/75 | 4,766 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | N E W M E X I C O | | | | |
| ** RESEARCH ** | | | | | | |
| NEW MEXICO, UNIV. OF<br>ALBUQUERQUE | COMPREHENSIVE<br>EFFECT LOCAL/REGIONAL IMPLEMENTATION<br>INSTRUMENT IN ACHIEVING ENVRN QUAL. | KNEESE, ALLEN | 803539010 | NEW | 01/29/75 | 78,747 |
| ** DEMONSTRATION ** | | | | | | |
| NEW MEXICO STATE UNIV.<br>LAS CRUCES | WATER<br>DEMO. OF IRRIGATION RETURN FLOW<br>SALINITY CONTROL IN THE UPPER RIO GRANDE | CLARK, JOHN W. | 803565010 | NEW | 01/23/75 | 207,940 |
| ** FELLOWSHIPS ** | | | | | | |
| NEW MEXICO STATE UNIV.<br>UNIVERSITY PARK | WATER<br>M.S./CIVIL ENGR. | LYNCH, STEPHEN D. | 910560010 | NEW | 04/09/75 | 3,250 |
| NEW MEXICO, UNIV. OF<br>ALBUQUERQUE | WATER<br>PH.D. | ROSE, LOUIS W. | 910612010 | NEW | 04/30/75 | 3,495 |

## N E W   Y O R K

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ALBANY MEDICAL COLLEGE<br>ALBANY | COMPREHENSIVE<br>INTERNATIONAL SYMPOSIUM ON WATER QUALITY | COULSTON, FREDERICK | 803954010 | NEW | 06/17/75 | 18,400 |
| AMERICAN INST. OF CHEMICAL ENGRS.<br>NEW YORK | WATER<br>NATIONAL CONFERENCE ON CONTROL OF HAZARDOUS MATERIAL SPILLS | VAN ANTWERPEN, F. J. | 802610012 | INCR | 03/21/75 | 2,914 |
| BOYCE THOMPSON INST. FOR PLANT RES.<br>YONKERS | AIR<br>RESPONSE OF PLANTS TO AIR POLLUTANTS | WEINSTEIN, LEONARD H. | 801070140 | CONT | 04/10/75 | 86,400 |
| BUFFALO SEWER AUTH.<br>BUFFALO | WATER<br>BUFFALO SEWER AUTH. PRETREATMENT PROJECT | ROSENSTEEN, IRWIN | 803005013 | INCR | 04/30/75 | 41,400 |
| CENTER FOR POLICY RESEARCH, INC.<br>NEW YORK | WATER<br>EPIDEMIOLOGICAL STUDY OF HEALTH EFFECTS AMONG SWIMMERS AT N.Y. BEACHES | HABERMAN, PAUL W. | 803254021 | INCR | 03/13/75 | 20,892 |
| COLUMBIA UNIV.<br>NEW YORK | WATER<br>DREDGE SPOILS & SLUDGE IN TRACE METAL BUDGET OF ESTUARINE & COASTAL H2O | FOUNTAIN, THOMAS D. | 803113013 | INCR | 03/14/75 | 8,000 |
| | | | 803113020 | CONT | 06/30/75 | 67,226 |
| CORNELL UNIV.<br>ITHACA | AIR<br>EFFECTS OF SO2 & NOX ON THE SOIL ECOSYSTEM | ALEXANDER, MARTIN | 803691010 | NEW | 04/22/75 | 44,862 |
| CORNELL UNIV.<br>ITHACA | WATER<br>DESIGN & APPLICATION MANUAL FOR POULTRY WASTE MANAGEMENT | JEWELL, WILLIAM J. | 803866010 | NEW | 06/06/75 | 45,000 |
| INTERNATIONAL PAPER CO.<br>TUXEDO PARK | WATER<br>ADVANCED FILTRATION OF PULP MILL WASTES | BREITHAUPT, LEA J. | 803667010 | NEW | 03/27/75 | 100,000 |
| MANHATTAN COLLEGE<br>BRONX | WATER<br>MATHEMATICAL MODELS OF WATER QUALITY IN LARGE LAKES | DITORO, DOMINIC M. | 803030020 | CONT | 02/26/75 | 110,718 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| MANHATTAN COLLEGE<br>BRONX | WATER<br>APPLICATION & DEVELOPMENT OF EUTROPHICATION PLANNING MODELS | THOMANN, ROBERT V. | 803680010 | NEW | 04/02/75 | 120,475 |
| NEW YORK CITY COLLEGE<br>NEW YORK | AIR<br>REMOTE MONITORING OF AIR POLLUTION PRODUCED BY STATIONARY & AREA SOURCES | AHMED, SAMIR A. | 803109020 | CONT | 05/13/75 | 21,912 |
| NEW YORK STATE DEPT. OF ENVRN. CONSERV<br>ALBANY | AIR<br>SULFATE AND PARTICLATE EMISSIONS FORM IN-USE CATALYST VEHICLES | GIBBS, RICHARD E. | 803520010 | NEW | 01/15/75 | 175,000 |
| NEW YORK STATE DEPT. OF ENVRN. CONSERV<br>ALBANY | AIR<br>RESEARCH ON AUTOMOBILE POLLUTION DISPERSION ("ROAD") | HAWLEY, JOHN | 803881010 | NEW | 06/30/75 | 144,000 |
| NEW YORK STATE UNIV.<br>STONY BROOK | WATER<br>SUPPORT OF THIRD INTERNATIONAL ESTUARINE RESEARCH CONFERENCE | O'CONNOR, JOEL S. | 803694010 | NEW | 03/06/75 | 20,000 |
| NEW YORK UNIV.<br>NEW YORK | SOLID WASTE<br>NOVEL PRETREATMENTS FOR WASTE CELLULOSE HYDROLYSIS | BRENNER, WALTER | 803664010 | NEW | 04/16/75 | 45,828 |
| NEW YORK, UNIV. OF<br>ALBANY | WATER<br>LAKE ERIE NUTRIENT CONTROL PROGRAM:ASSESSMENT OF EFFECTIVENESS | SWEENEY, ROBERT A. | 802706023 | INCR | 03/13/75 | 110,000 |
| NEW YORK, UNIV. OF<br>ALBANY | WATER<br>ZOOPLANKTON & WATER QUALITY IN SOUTHERN LAKE HURON | MCNAUGHT, DONALD C. | 803178013 | INCR | 03/06/75 | 70,000 |
| ROCHESTER, UNIV. OF<br>ROCHESTER | AIR<br>MEASUREMENT OF AIRBORNE PARTICULATES | DAHNEKE, BARTON E. | 803065020 | CONT | 05/05/75 | 24,000 |
| SYRACUSE UNIV.<br>SYRACUSE | WATER<br>DEVELOPMENT OF METHODS FOR QUANTITATION OF ADSORBED VIRUS IN WASTEWATER | SMITH, JAMES | 803774010 | NEW | 06/04/75 | 19,000 |
| SYRACUSE UNIV.<br>SYRACUSE | WATER<br>MONITORING OF POLYNUCLEAR AROMATIC HYDROCARBONS IN SELECTED U.S. WATERS | SAXENA, JITENDRA | 803977010 | NEW | 06/30/75 | 56,012 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| SYRACUSE UNIV.<br>SYRACUSE | PESTICIDES<br>EFFECTS & FATE OF SELECTED PESTICIDES IN MARINE ALGAE | SIKKA, HARISH C. | 803943010 | NEW | 06/16/75 | 24,995 |
| UNION CARBIDE CORP.<br>NEW YORK | WATER<br>EXTRACT CAPROLACTAM & ACRYLONITRILE/ ACETCNITRILE FROM PLANT EFFLUENTS | SOMEKH, GEORGE S. | 803737010 | NEW | 04/02/75 | 93,078 |
| ** DEMONSTRATION ** | | | | | | |
| GRUMMAN AEROSPACE CORP.<br>BETHPAGE | WATER<br>TREATMENT OF FLUORIDE & NITRATE INDUSTRIAL WASTES | STAEBLER, CHRISTIAN | 800680015 | INCR | 05/05/75 | 14,630 |
| INTERSTATE SANITATION COMMISSION<br>NEW YORK | AIR<br>CONTROL OF SUSPENDED PARTICULATES | MYTELKA, ALAN I. | 802496020 | CONT | 04/02/75 | 148,432 |
| NEW YORK, CITY OF<br>NEW YORK | COMPREHENSIVE<br>SUSPENSION FIRING OF REFUSE-OIL MIXTURES IN A CONVERTED UTILITY BOILER | O'REILLY, LEONARD | 803991010 | NEW | 06/30/75 | 50,000 |
| OWEGO, TOWN OF<br>OWEGO | WATER<br>SINGLE-STAGE NITRIFICATION-DENITRIFICATION FULL-SCALE STUDY | ENGELHARD, WILLIAM E. | 803618010 | NEW | 02/05/75 | 49,497 |
| UNION CARBIDE CORP.<br>NEW YORK | WATER<br>TREATMENT OF PETROCHEMICAL WASTE WATER FOR REUSE | O'BRYAN, D. D. | 801398014 | INCR | 06/24/75 | 40,000 |
| ** TRAINING ** | | | | | | |
| ALBANY, CITY OF<br>ALBANY | WATER<br>SUMMER TRAINING IN WATER & WASTEWATER | SHOUDY, CHARLES | 900671010 | NEW | 06/05/75 | 3,000 |
| MANHATTAN COLLEGE<br>BRONX | WATER<br>TRAINING PROFESSIONAL SPECIALISTS IN WATER POLLUTION CONTROL | JERIS, JOHN S. | 900135071 | INCR | 05/02/75 | 61,728 |
| NEW YORK CITY UNIV. RES. FDN.<br>NEW YORK | AIR<br>SUMMER INTERNSHIPS IN PROBLEMS OF ENVRN. QUALITY & ECOLOGICAL BALANCE | PFEFFER, ROBERT | 900554010 | NEW | 06/24/75 | 10,105 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | N E W   Y O R K | | | | | |
| ** TRAINING ** | | | | | | |
| NEW YORK POLYTECHNIC INST.<br>NEW YORK | AIR<br>AIR RESOURCES ENGINEERING | MOLOF, ALAN H. | 900294090 | CONT | 06/02/75 | 58,905 |
| NEW YORK STATE DEPT. OF ENVRN. CONSERV<br>ALBANY | WATER<br>DEMONSTRATION OF A TWO YEAR AAS WATER QUALITY MONITORING PROGRAM | CAMPBELL, DANIEL J. | 900540010 | NEW | 04/30/75 | 60,316 |
| ULSTER CNTY. COMMUN. COLLEGE<br>STONE RIDGE | WATER<br>PROGRAM FOR INSTRUCTIONAL MATERIAL, EVALUATION & CURRICULUM DEVELOPMENT | GLAZER, RICHARD B. | 900508020 | CONT | 06/06/75 | 14,850 |
| ** FELLOWSHIPS ** | | | | | | |
| CORNELL UNIV. LAW SCH.<br>ITHACA | WATER<br>J.D./ENVRN. LAW | SPITZER, SCOTT LLOYD | 910543010 | NEW | 03/25/75 | 6,500 |
| MANHATTAN COLLEGE<br>RIVERDALE | WATER<br>M.S./ENVRN. ENGR. | MICELLI, THOMAS | 910504010 | NEW | 03/27/75 | 1,535 |
| MANHATTAN COLLEGE<br>BRONX | WATER<br>M.S./ENGR. | MOBARAK, SIMON E. | 910552010 | NEW | 03/10/75 | 6,500 |
| NEW YORK POLYTECHNIC INST.<br>BROOKLYN | WATER<br>PH.D./WATER POLLUTION | BURGER, THEODORE B. | 910656010 | NEW | 05/29/75 | 3,120 |
| NEW YORK STATE UNIV.<br>AMHERST | AIR<br>M.S./INDUSTRIAL ENGR. | SCIASCIA, EUGENE J. | 910598010 | NEW | 06/20/75 | 6,365 |
| NEW YORK STATE UNIV.<br>BUFFALO | WATER<br>PH.D./ENVRN. ENGR. | CRAIG, EDWARD | 910509010 | NEW | 01/23/75 | 6,500 |
| NEW YORK UNIV.<br>NEW YORK | AIR<br>M.S./URBAN PLANNING | ALAGNA, PETER L. | 9103'5012 | INCR | 06/20/75 | 3,175 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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## NEW YORK

** FELLOWSHIPS **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| RENSSELAER POLY. INST.<br>TROY | AIR<br>M.S./URBAN & ENVRN. STUDIES | NEIGHMOND, GARRY B. | 910546010 | NEW | 05/28/75 | 8,435 |
| RENSSELAER POLYTECHNIC INST.<br>TROY | AIR<br>M.S./ENVRN. ENGR. | BUTTERWORTH, ROBERT | 910542010 | NEW | 05/21/75 | 6,860 |
| ROCHESTER INST. OF TECH.<br>ROCHESTER | WATER<br>B.S./MECH. ENGR. | ROBERTS, WAYNE J. | 910541010 | NEW | 05/29/75 | 6,500 |

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| | NORTH CAROLINA | | | | | |
| ** RESEARCH ** | | | | | | |
| DUKE UNIV.<br>DURHAM | AIR<br>DEVELOPMENT OF A TWO STAGE PARTICLE FRACTIONATOR BY FILTRATION | BUZZARD, GALE H. | 803018020 | CONT | 02/26/75 | 16,703 |
| DUKE UNIV.<br>DURHAM | WATER<br>EFFECT OF MERCURY OF LARVAE OF MARINE CRUSTACEA | COSTLOW, JOHN D. | 801305030 | CONT | 04/02/75 | 55,500 |
| DUKE UNIV.<br>DURHAM | PESTICIDES<br>EFFECT OF INSECT GROWTH REGULATOR & JUVENILE HORMONE MIMICS ON CRUSTACEAN | COSTLOW, JOHN D. | 803838010 | NEW | 04/29/75 | 49,993 |
| NORTH CAROLINA STATE UNIV.<br>RALEIGH | AIR<br>MATHEMATICAL TECHNIQUES FOR X-RAY ANALYZERS | GARDNER, ROBIN P. | 802759020 | CONT | 05/19/75 | 20,000 |
| NORTH CAROLINA STATE UNIV.<br>RALEIGH | WATER<br>CHARACTERIZATION & DISPOSAL OF CLAY SLIMES FROM SAND & GRAVEL MINING OPER | MALCOM, H. R. | 803908010 | NEW | 06/17/75 | 70,105 |
| NORTH CAROLINA STATE UNIV.<br>RALEIGH | COMPREHENSIVE<br>STUDY OF DESIGN, CONSTRUCTION & USE ON ACCURACY OF TYPE-S PITOT TUBE | DEJARNETTE, F. R. | 803168020 | CONT | 05/13/75 | 22,000 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | AIR<br>OUTDOOR SIMULATION OF AIR POLLUTION CONTROL STRATEGIES | JEFFRIES, HARVEY | 800916030 | NEW | 01/22/75 | 125,000 |
| | | | 800916032 | INCR | 06/20/75 | 3,475 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | AIR<br>EFFECT OF ETIOLOGICALLY-DEFINED RESPIRATORY INFECTIONS ON LUNG FUNCTION | COLLIER, ALBERT M. | 802233030 | CONT | 05/05/75 | 165,108 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | AIR<br>STUDY OF AEROSOL FORMATION MECHANISMS IN A CONTROLLED ATMOSPHERE | REIST, PARKER | 802472020 | CONT | 01/20/75 | 80,000 |
| NORTH CAROLINA, UNIV. OF<br>RALEIGH | WATER<br>POLLUTION FROM RURAL LAND RUNOFF | HUMENIK, F. J. | 803328020 | CONT | 06/02/75 | 133,607 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| NORTH CAROLINA | | | | | | |
| ** RESEARCH ** | | | | | | |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | WATER<br>EXAM. OF DEPENDENCE OF PLAQUE TITER OF PHYSICAL AGGREGATION OF VIRUSES | SHARPE, D. GORDON | 803771010 | NEW | 05/05/75 | 43,965 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | COMPREHENSIVE<br>PLNG FOR REGIONAL ENVRN QUALITY MGMT & RELATED USE &TRANSPORTATION SYSTEM | MOREAU, DAVID H. | 803636010 | NEW | 03/06/75 | 85,737 |
| ST. AUGUSTINE'S COLLEGE<br>RALEIGH | COMPREHENSIVE<br>LIFE SPAN EFFECT OF LOW LEVEL HTO EXPOSURE DURING PREGNANCY IN RATS | JOHNSON, W. W. | 803764010 | NEW | 06/04/75 | 58,461 |
| ** TRAINING ** | | | | | | |
| NORTH CAROLINA STATE UNIV.<br>RALEIGH | WATER<br>INDUSTRIAL WASTE CONTROL & ABATEMENT | SMALLWOOD, CHARLES | 900184071 | INCR | 04/30/75 | 24,318 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | AIR<br>GRADUATE TRAINING IN AIR POLLUTION | STERN, ARTHUR E. | 900053052 | INCR | 03/19/75 | 59,559 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | AIR<br>GRADUATE TRAINING IN AIR POLLUTION | REIST, PARKER C. | 900545010 | NEW | 05/28/75 | 55,063 |
| ** FELLOWSHIPS ** | | | | | | |
| APPALACHIAN STATE UNIV.<br>BOONE | AIR<br>M.A./POLITICAL SCIENCE | EDSEL, WILLIAM M. | 910516010 | NEW | 02/14/75 | 2,040 |
| NORTH CAROLINA STATE UNIV.<br>RALEIGH | WATER<br>M.S./CIVIL ENGR. | MUNDER, JERRY W. | 910608010 | NEW | 05/14/75 | 6,500 |
| NORTH CAROLINA, UNIV. OF<br>CHAPEL HILL | WATER<br>M.S./ENVRN. ENGR. | WENDLE, JEFFREY G. | 910640010 | NEW | 05/09/75 | 6,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | NORTH DAKOTA | | | | | |
| ** RESEARCH ** | | | | | | |
| NORTH DAKOTA STATE UNIV.<br>FARGO | WATER<br>DISSOLVED OXYGEN CONCENTRATIONS IN NATURAL SPAWNING HABITATS OF FISH | PETERKA, JOHN | 801976030 | CONT | 01/29/75 | 6,502 |

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** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| BATTELLE MEMORIAL INST.<br>COLUMBUS | WATER<br>ASSESSMENT OF TECHNOLOGY FOR UTILIZATION OF BAYER PROCESS RED MUDS | GOLDBERGER, WILLIAM M. | 803760010 | NEW | 05/05/75 | 47,500 |
| BATTELLE MEMORIAL INST.<br>COLUMBUS | WATER<br>RECOVERY OF METAL VALUES FROM METAL FINISHING WASTES & SLUDGE | CHERRY, R. H. | 803787010 | NEW | 05/29/75 | 103,600 |
| BATTELLE MEMORIAL INST.<br>COLUMBUS | SOLID WASTE<br>ENVRN. ASSESSMENT OF FUTURE DISPOSAL OF HAZARDOUS MATERIALS-PLASTICS | VAUGHN, DALE A. | 803111013 | INCR | 03/17/75 | 18,627 |
| BATTELLE MEMORIAL INST.<br>COLUMBUS | SOLID WASTE<br>ENVRN. EFFECT OF UTILIZING SOLID WASTE AS SUPPLEMENTARY POWER PLANT FUEL | VAUGHAN, DALE A. | 804008020 | CONT | 06/16/75 | 290,000 |
| BATTELLE MEMORIAL INST.<br>COLUMBUS | COMPREHENSIVE<br>ORGANIC CHEM CHARACTERIZATION OF ATMOSPHERIC, AUTOMOTIVE & MODEL AEROSOLS | SCHWARTZ, WARREN E. | 801174024 | INCR | 04/22/75 | 39,900 |
| CASE WESTERN RESERVE UNIV.<br>CLEVELAND | WATER<br>DISPERSION & FATE OF HAZARDOUS MATERIALS IN LARGE LAKES | LICK, WILBERT | 803704010 | NEW | 05/20/75 | 118,202 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | WATER<br>COMPARATIVE STUDY OF INACTIVATION OF VIRUSES IN WASTEWATER BY CHLORINE | SCARPINO, PASQUALE | 800370040 | CONT | 01/03/75 | 69,000 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | WATER<br>PLANNING WATER SUPPLY: BLDG. PERMITS & COST/RATE DIFFERENTIALS | GODDARD, HAYNES C. | 803596010 | NEW | 03/24/75 | 30,368 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | WATER<br>HEALTH RISKS OF HUMAN EXPOSURE TO WASTEWATERS | CLARK, C. SCOTT | 803643010 | NEW | 03/10/75 | 182,742 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | WATER<br>A NEW CHROMATOGRAPHIC METHOD FOR THE SEPARATION OF ALGAL PIGMENTS | VESTAL, J. ROBIE | 803761010 | NEW | 06/06/75 | 5,000 |
| DAYTON, UNIV. OF<br>DAYTON | SOLID WASTE<br>LABORATORY EVALUATION OF THERMAL DECOMPOSITION OF PESTICIDES | DUVALL, DONOVAN S. | 803540010 | NEW | 02/12/75 | 97,726 |

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| ** RESEARCH ** | | | | | | |
| KROGER CO.<br>CINCINNATI | WATER<br>DIARY FOOD PLANT WASTE CONTROL | SHIFFERMILLER, WM. | 803374010 | NEW | 06/30/75 | 167,300 |
| NATIONAL WATER WELL ASSOC.<br>COLUMBUS | WATER<br>CONSTRUCTION GUIDE OF SUBSURFACE INJECTION SYSTEMS & ABANDONMENT PROCEDUR | LEHR, JAY H. | 803889010 | NEW | 06/23/75 | 76,415 |
| OHIO STATE UNIV.<br>COLUMBUS | WATER<br>LAKE ERIE NUTRIENT CONTROL PROGRAM: ASSESSMENT OF ITS EFFECTIVENESS | HERDENDORF, CHARLES E. | 802543030 | CONT | 03/05/75 | 127,000 |
| OHIO STATE UNIV.<br>COLUMBUS | WATER<br>EFFECTS OF DIFFERENT FORMS OF SELENIUM IN DRINKING WATER | HETLAND, LYNN B. | 803755010 | NEW | 06/02/75 | 50,247 |
| OHIO STATE UNIV.<br>COLUMBUS | PESTICIDES<br>PROPAGATION OF INSECT VIRUSES IN CULTURED INSECT CELLS | HINK, WALTER F. | 802516030 | CONT | 05/12/75 | 43,613 |
| OHIO STATE UNIV.<br>COLUMBUS | COMPREHENSIVE<br>LAKE ERIE NUTRIENT CONTROL PROGRAM: ASSESSMENT OF ITS EFFECTIVENESS | HERDENDORF, CHARLES | 802543031 | INCR | 05/29/75 | 69,887 |
| OHIO STATE UNIV. RES. FDN.<br>COLUMBUS | AIR<br>MECHANISMS OF PHOTOCHEMICALLY INITIATED OXIDATIONS | CALVERT, JACK | 800398150 | CONT | 01/29/75 | 50,000 |
| OHIO STATE UNIV. RES. FDN.<br>COLUMBUS | AIR<br>APPLICATION OF FOURIER TRANSFORM SPECTROSCOPY TO AIR POLLUTION PROBLEMS | SHAW, JOHN W. | 803868010 | NEW | 06/17/75 | 95,000 |
| OHIO STATE UNIV. RES. FDN.<br>COLUMBUS | COMPREHENSIVE<br>MECHANISMS OF PHOTOCHEMICALLY INITIATED OXIDATIONS | CALVERT, JACK G. | 800398151 | INCR | 06/04/75 | 45,000 |
| ** DEMONSTRATION ** | | | | | | |
| ADVANCE PLATING CO.<br>CLEVELAND | WATER<br>EVAPORATIVE RECOVERY OF CHROMIUM PLATING RINSE WATERS | DURKIN, EDWARD P. | 803781010 | NEW | 05/08/75 | 40,000 |

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| ** DEMONSTRATION ** | | | | | | |
| FRANKLIN, CITY OF<br>FRANKLIN | SOLID WASTE<br>FLUID MECHANICAL SEPARATION SOLID WASTES/FLUID BED OXIDATION COMBUSTIBLES | EICHHOLZ, BERNARD F. | 802217037 | INCR | 05/14/75 | 45,400 |
| MONTGOMERY CNTY.<br>DAYTON | SOLID WASTE<br>RESOURCE RECOVERY IMPLEMENTATION & DEMONSTRATION | PHILPOT, EARNIE S. | 804103010 | NEW | 06/30/75 | 70,000 |
| TOLEDO PICKLING&STEEL SERVICE, INC.<br>TOLEDO | WATER<br>REGENERATION OF HYDROCHLORIC ACID PICKLE LIQUOR | WADE, JOHN W. | 802142014 | INCR | 01/29/75 | 390 |
| ** TRAINING ** | | | | | | |
| CINCINNATI, UNIV. OF<br>CINCINNATI | AIR<br>TRAINING PROGRAM IN AIR POLLUTION | SALTZMAN, BERNARD E. | 900228021 | INCR | 01/17/75 | 3,000 |
| | | | 900228030 | CONT | 05/29/75 | 58,049 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | WATER<br>GRADUATE TRAINING IN WATER POLLUTION CONTROL | EYE, J. DAVID | 900123061 | INCR | 04/08/75 | 42,220 |
| INSTITUTE FOR ENVRN. EDUC.<br>CLEVELAND | WATER<br>GRADUATE SUMMER & INSERVICE TRAINING-STATE-WIDE WATER QUALITY DATA SYSTEM | OFFUTT, THOMAS W. | 900532010 | NEW | 03/25/75 | 65,799 |
| ** FELLOWSHIPS ** | | | | | | |
| CINCINNATI, UNIV. OF<br>CINCINNATI | AIR<br>M.S./ENVRN. ENGR. | NUNLEY, JOHN F. | 910307011 | INCR | 01/20/75 | 50 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | AIR<br>M.S./CIVIL & ENVRN. ENGR. | WINSTON, THOMAS A. | 910459012 | INCR | 06/23/75 | 2,098 |
| CINCINNATI, UNIV. OF<br>CINCINNATI | AIR<br>M.S./ENVRN. ENGR. | HEMKER, GREGORY | 910511010 | NEW | 05/21/75 | 4,195 |

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** FELLOWSHIPS **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| CINCINNATI, UNIV. OF<br>CINCINNATI | AIR<br>ENVRN. ENGR. | HOLLAND, RICHARD M. | 910556010 | NEW | 05/28/75 | 9,750 |
| WRIGHT STATE UNIV.<br>DAYTON | AIR<br>ANALYTICAL-ENVIRONMENTAL CHEM. | BUCHANAN, JAMES J. | 910684010 | NEW | 06/24/75 | 990 |

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| ** RESEARCH ** | | | | | | |
| CENTRAL STATE UNIV.<br>EDMOND | WATER<br>ECONOMIC ASSESSMENT OF WASTE WATER AQUACULTURE TREATMENT SYSTEMS | HENDERSON, UPTON B. | 803623010 | NEW | 02/11/75 | 21,949 |
| EAST CENTRAL OKLAHOMA STATE UNIV.<br>ADA | WATER<br>A METHOD FOR DISSEMINATION OF ANIMAL WASTE MGMT. TECHNICAL INFORMATION | ROWE, M. L. | 801454030 | CONT | 01/06/75 | 37,740 |
| OKLAHOMA STATE DEPT. OF HEALTH<br>OKLAHOMA CITY | WATER<br>SPRAY-RUNOFF TREATMENT OF MUNICIPAL WASTEWATERS | COLEMAN, MARK S. | 803218012 | INCR | 03/13/75 | 71,245 |
| OKLAHOMA STATE DEPT. OF HEALTH<br>OKLAHOMA CITY | WATER<br>ADVANCED BIOLOGICAL TREATMENT (AQUACULTURE) OF MUNICIPAL WASTEWATERS | JARMAN, RON | 803703010 | NEW | 05/12/75 | 177,390 |
| OKLAHOMA STATE UNIV.<br>STILLWATER | AIR<br>SYNTHESIS &/OR PURIFICATION OF HIGH PURITY AROMATIC COMPOUNDS | EISENBRAUN, E. J. | 803097020 | CONT | 04/10/75 | 30,000 |
| OKLAHOMA STATE UNIV.<br>STILLWATER | WATER<br>RANGELAND WATERSHED WATER BUDGET & GRAZING CATTLE WASTE NUTRIENT CYCLING | POWELL, JEFF | 803735010 | NEW | 05/02/75 | 152,701 |
| OKLAHOMA, UNIV. OF<br>NORMAN | WATER<br>PERFORMANCE EVALUATION OF EXISTING AERATED LAGOON SYSTEM AT BIXBY, OKLAHO | REID, GEORGE W. | 803916010 | NEW | 06/18/75 | 67,317 |
| TULSA, UNIV. OF<br>TULSA | WATER<br>JOINT EPA/API/TU SYMPOSIUM-ENVRN. CONSERVATION IN PETROLEUM REFINING | MANNING, FRANCIS S. | 803957010 | NEW | 05/14/75 | 30,384 |
| ** DEMONSTRATION ** | | | | | | |
| EAST CENTRAL OKLAHOMA STATE UNIV.<br>ADA | WATER<br>INTERMITTENT SAND FILTERS AS A TREATMENT SYSTEM FOR SMALL MEAT PACKERS | ROWE, M. L. | 803766010 | NEW | 06/23/75 | 55,455 |
| W. E. REEVES PACKINGHOUSE<br>ADA | WATER<br>SMALL MEATPACKER WASTE TREATMENT SYSTEMS | REEVES, W. E. | 921259012 | INCR | 06/26/75 | 1,586 |

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| ** TRAINING ** | | | | | | |
| OKLAHOMA STATE UNIV.<br>STILLWATER | WATER<br>TRAINING IN WATER POLLUTION CONTROL/ ENGR. SCIENCE/INTERDISCIPLINARY | GAUDY, ANTHONY F. | 900078062 | INCR | 04/29/75 | 2,774 |
| OKLAHOMA STATE UNIV.<br>STILLWATER | RACIATION<br>RADIOLOGICAL HEALTH TECHNICIAN TRAINING PROGRAM | MCNEILL, PERRY R. | 900282102 | INCR | 01/16/75 | 39,000 |
| ** FELLOWSHIPS ** | | | | | | |
| OKLAHOMA, UNIV. OF<br>NORMAN | AIR<br>M.S./ENVRN. SCIENCE | RICHARDSON, MICHAEL | 910682010 | NEW | 06/24/75 | 8,350 |
| OKLAHOMA, UNIV. OF<br>NORMAN | WATER<br>B.S./CIVIL ENGR. | MCBRYDE, GEORGE C. | 910526010 | NEW | 01/16/75 | 4,990 |
| OKLAHOMA, UNIV. OF<br>NORMAN | WATER<br>M.S./ENVRN. SCIENCE | WOLF, GEORGE D. | 910649010 | NEW | 06/24/75 | 5,800 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | O R E G O N | | | | | |
| ** RESEARCH ** | | | | | | |
| OREGON STATE GAME COMM.<br>CORVALLIS | WATER<br>EFFECT OF COPPER & ZINC ON SEAWATER ADAPTATION OF JUVENILE COHO SALMON | WAGNER, H. H. | 802468011 | INCR | 01/30/75 | 10,131 |
| OREGON STATE UNIV.<br>CORVALLIS | WATER<br>LAB DETERMINATION OF CHLORAMINE CONCENTRATIONS SAFE FOR AQUATIC LIFE | WARREN, CHARLES E. | 802286030 | CONT | 05/19/75 | 29,174 |
| | | | 802286031 | INCR | 06/20/75 | 35,000 |
| OREGON STATE UNIV.<br>CORVALLIS | WATER<br>COMPREHENSIVE FEEDLOT POLLUTION CONTROL DESIGN MODEL | MINER, J. RONALD | 803819010 | NEW | 05/13/75 | 20,307 |
| OREGON STATE UNIV.<br>CORVALLIS | COMPREHENSIVE<br>EFFECTS OF NON-GASEOUS AIRBORNE POLLUTANTS FROM COAL-FIRED POWER PLANTS | MOORE, THOMAS C. | 803948010 | NEW | 06/30/75 | 70,990 |
| ** DEMONSTRATION ** | | | | | | |
| LANE CNTY.<br>EUGENE | COMPREHENSIVE<br>ENERGY RECOVERY IMPLEMENTATION PROGRAM FOR LANE COUNTY | BAILEY, BRUCE B. | 804135010 | NEW | 06/30/75 | 50,000 |
| ** TRAINING ** | | | | | | |
| LINN-BENTON COMMUN. COLLEGE<br>ALBANY | WATER<br>WASTEWATER TECHNOLOGY | CARNEGIE, JOHN W. | 900128050 | CONT | 05/13/75 | 21,735 |
| LINN-BENTON COMMUN. COLLEGE<br>ALBANY | WATER<br>TRAINING FOR N.P.D.E.S. SELF-MONITORING LABORATORY & REPORTING PROCEDURES | SCOTT, PETER | 900561010 | NEW | 06/27/75 | 24,995 |
| OREGON MUSEUM OF SCIENCE & INDUSTRY<br>PORTLAND | WATER<br>GRADUATE PROGRAM TO DEVELOP & IMPLEMENT STATEWIDE H2O QUALITY EVALUATION | STOTLER, DONALD W. | 900531010 | NEW | 01/27/75 | 30,200 |
| OREGON STATE UNIV.<br>CORVALLIS | AIR<br>GRADUATE TRAINING IN AIR POLLUTION CONTROL | BOUBEL, RICHARD W. | 900538010 | NEW | 05/23/75 | 55,327 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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## P E N N S Y L V A N I A

** RESEARCH **

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|---|---|---|---|---|---|---|
| AMERICAN SOCIETY FOR TESTING&MATERIAL<br>PHILADELPHIA | CCMPREHENSIVE<br>CONFERENCE ON INTERNATIONAL AIR QUALITY MEASUREMENTS | GIEVER, PAUL M. | 803593010 | NEW | 01/16/75 | 5,000 |
| CARNEGIE-MELLON UNIV.<br>PITTSBURGH | AIR<br>ELECTROSTATIC EFFECTS IN FABRIC FILTRATION | PENNEY, GAYLORD W. | 803020020 | CONT | 04/21/75 | 87,565 |
| CARNEGIE-MELLON UNIV.<br>PITTSBURGH | AIR<br>USE OF AIR QUALITY SIMULATION MODELS FOR COMPARISON OF POLLUTION CONTROL | KORTANEK, KENNETH O. | 803632010 | NEW | 03/20/75 | 7,056 |
| DRAVO CORP.<br>PITTSBURGH | WATER<br>MANAGING & DISPOSING OF RESIDUES FROM ENVRN. CONTROL FACILITIES | PASZTOR, LASZLO | 803619010 | NEW | 03/26/75 | 104,455 |
| DREXEL UNIV.<br>PHILADELPHIA | WATER<br>SPILL ALERT DEVICE FOR IMPOUNDED HAZARDOUS MATERIALS | KOENER, ROBERT M. | 802511030 | CONT | 04/16/75 | 50,000 |
| DREXEL UNIV.<br>PHILADELPHIA | WATER<br>FATE OF POLLUTANTS IN THE AIR & WATER ENVRN. | SUFFET, IRWIN H. | 803588010 | NEW | 02/26/75 | 4,695 |
| FRANKLIN INST.<br>PHILADELPHIA | COMPREHENSIVE<br>PREPARATION FOR THE INDUSTRIAL TECHNOLOGY BULLETIN | MURPHY, JOANNE S. | 803142013 | INCR | 06/09/75 | 37,965 |
| FRANKLIN INST. RES. LAB.<br>PHILADELPHIA | WATER<br>PREPARATION OF THE MUN. TECH. BULLETIN & INPUT TO THE WRSIC DATA SERVICE | MURPHY, JOANNE S. | 803613010 | NEW | 04/02/75 | 79,038 |
| LEHIGH UNIV.<br>BETHLEHEM | WATER<br>EFFECTS OF TEMPERATURE,SALINITY, DISSOLVED OXYGEN & TURBIDITY ON ORGANISMS | BARBER, S. B. | 802440030 | CONT | 05/23/75 | 48,535 |
| PENNSYLVANIA MEDICAL COLLEGE<br>PHILADELPHIA | AIR<br>STUDIES ON THE EFFECT OF ATMOSPHERIC POLLUTANTS ON CARCINOGENESIS | LEIGHTON, JOSEPH | 802039020 | CONT | 04/29/75 | 50,000 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | AIR<br>SELECT RESEARCH GROUP IN AIR POLLUTION METECROLOGY | THOMSON, DENNIS W. | 800397031 | INCR | 01/10/75 | 21,828 |

## P E N N S Y L V A N I A

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | | 800397032 | INCR | 02/05/75 | 34,899 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | AIR<br>REACTIONS IN POLLUTED ATMOSPHERES | HEICKLEN, JULIAN P. | 800874040 | RNWL | 03/20/75 | 55,000 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | AIR<br>DESIGN OF STACK SAMPLING SYSTEM WITH DILUTION | HEINSOHN, ROBERT J. | 803560010 | NEW | 02/18/75 | 35,000 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | AIR<br>CHEMICAL IONIZATION MASS SPECTROMETRY OF VOLATILE LANTHANIDE CHELATES | RISBY, TERRENCE H. | 803651010 | NEW | 06/16/75 | 62,000 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | COMPREHENSIVE<br>AIR POLLUTION & INTRA-URBAN MORTALITY | FERRAR, TERRY A. | 803609010 | NEW | 03/25/75 | 25,218 |
| | | | 803609011 | INCR | 06/19/75 | 1,465 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | COMPREHENSIVE<br>MANUAL OF PRACTICE FOR PREMINING PLANNING EASTERN SURFACE COAL MINING | RAMANI, R. V. | 803882010 | NEW | 06/06/75 | 127,174 |
| PHILADELPHIA ACADEMY NATURAL SCIENCES<br>PHILADELPHIA | WATER<br>EFFECT OF NITRILOTRIACETIC ACID & MICRONUTRIENTS ON AQUATIC COMMUNITIES | PATRICK, RUTH | 801951020 | CONT | 06/30/75 | 164,307 |
| PITTSBURGH, UNIV. OF<br>PITTSBURGH | WATER<br>PERFORMANCE EVALUATION OF EXISTING AERATED LAGOON SYSTEM AT WINDBER, PENN | EARNEST, CHARLES M. | 803975010 | NEW | 06/24/75 | 44,000 |
| ST. VINCENT COLLEGE<br>LATROBE | AIR<br>DETERMINATION OF NO EFFECT LEVEL OF ALLERGIC RESPONSES TO PLATINUM | TAUBLER, JAMES H. | 803036020 | CONT | 03/20/75 | 65,000 |
| THOMAS JEFFERSON UNIV.<br>PHILADELPHIA | PESTICIDES<br>ORGANOPHOSPHATE INSECTICIDES ON BENZO(A)PYRENE CARCINOGENESIS | TRIOLO, ANTHONY | 803486010 | NEW | 02/03/75 | 34,946 |

## P E N N S Y L V A N I A

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** DEMONSTRATION ** | | | | | | |
| ALAN WOOD STEEL CO.<br>CONSHOHOCKEN | WATER<br>TREATMENT OF COKE PLANT WASTE LIQUOR | KEMNER, WILLIAM F. | 800772013 | INCR | 06/23/75 | 85,919 |
| APPLIED TECHNOLOGY ASSOC., INC.<br>PHILADELPHIA | SOLID WASTE<br>DEMONSTRATION OF A LEACHATE TREATMENT PLANT | FUNGAROLI, A. A. | 903926010 | NEW | 06/16/75 | 215,097 |
| LEHIGH VALLEY INDUSTRIES, INC.<br>BANGOR | WATER<br>COAGULATION, OZONATION, & FILTRATION OF TEXTILE WASTEWATERS | RINKER, THOMAS L. | 803574010 | NEW | 02/11/75 | 82,000 |
| LYCOMING CNTY. BD. OF COMM.<br>WILLIAMSPORT | PESTICIDES<br>SOLID WASTE DISPOSAL & RESOURCE RECOVERY FACILITY W/LEACHATE COLLECTION | WALLS, JERRY | 803441010 | NEW | 04/21/75 | 1,018,504 |
| MATLACK, INC.<br>LANSDOWNE | WATER<br>TRUCK WASHING TERMINAL WATER POLLUTION CONTROL | O'BRIEN, JOHN E. | 803656010 | NEW | 03/17/75 | 150,000 |
| PALMER TOWNSHIP<br>EASTON | SOLID WASTE<br>CEMENT KILN FUEL DEMONSTRATION | ELO, HEIKKI K. | 803962010 | NEW | 06/30/75 | 350,000 |
| PHILADELPHIA WATER DEPT.<br>PHILADELPHIA | WATER<br>PURETEC, WET OXIDATION OF DIGESTED MUN. PLANT SLUDGE | NELSON, MICHAEL D. | 803644010 | NEW | 05/08/75 | 449,690 |
| WESTERN BERKS REFUSE AUTH.<br>SHILLINGTON | SOLID WASTE<br>ENERGY & MATERIALS RECOVERY SYSTEM IMPLEMENTATION | ABBOTT, JAMES D. | 804118010 | NEW | 06/30/75 | 50,000 |
| ** TRAINING ** | | | | | | |
| AMERICAN LAW INST.<br>PHILADELPHIA | COMPREHENSIVE<br>SUPPORT OF ENVRN LAWYERS & LAW STUDENTS TO ATTEND CONFERENCE ON ENVRN LAW | MACLAY, DONALD M. | 900492020 | NEW | 02/07/75 | 20,000 |
| PENNSYLVANIA ENVRN. COUNCIL, INC.<br>PHILADELPHIA | SOLID WASTE<br>HAZARDOUS WASTE MANAGEMENT SEMINARS | WINSOR, ELEANOR W. | 900662010 | NEW | 06/12/75 | 10,400 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | PENNSYLVANIA | | | | | |
| ** TRAINING ** | | | | | | |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | AIR<br>GRADUATE AIR POLLUTION TRAINING PROGRAM | MOROZ, WILLIAM J. | 900537010 | NEW | 05/29/75 | 55,347 |
| PHILADELPHIA WATER DEPT.<br>PHILADELPHIA | WATER<br>SUMMER TRAINING IN WATER & WASTEWATER | PLATTON, FLOYD H. | 900669010 | NEW | 06/05/75 | 2,000 |
| ** FELLOWSHIPS ** | | | | | | |
| LEHIGH UNIV.<br>BETHLEHEM | WATER<br>PH.D./CHEMICAL ENGR. | ALLEN, BILLY R. | 910683010 | NEW | 06/20/75 | 6,500 |
| PENNSYLVANIA STATE UNIV.<br>UNIVERSITY PARK | WATER<br>M.S./GEOLOGY | CURRAN, STEPHEN F. | 910605010 | NEW | 04/29/75 | 3,025 |
| PENNSYLVANIA, UNIV. OF<br>PHILADELPHIA | AIR<br>M.S./NUCLEAR ENGR. | MCCOURT, JOSEPH J. | 910519010 | NEW | 05/21/75 | 9,534 |
| PITTSBURGH, UNIV. OF<br>PITTSBURGH | AIR<br>M.S./HYGIENE | WARD, HENRY C. | 910570010 | NEW | 06/02/75 | 9,735 |
| VILLANOVA UNIV.<br>VILLANOVA | WATER<br>M.S./WATER RESOURCES ENGR. | MILHOUS, DAVID E. | 910606010 | NEW | 04/30/75 | 3,474 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | R H O D E   I S L A N D | | | | | |
| ** RESEARCH ** | | | | | | |
| RHODE ISLAND, UNIV. OF<br>KINGSTON | WATER<br>EFFECT OF THERMAL POLLUTION ON PELAGIC LARVAE OF CRUSTACEA | SASTRY, A. N. | 800981030 | CONT | 03/04/75 | 52,619 |
| RHODE ISLAND, UNIV. OF<br>KINGSTON | WATER<br>PROBLEM OF OCEAN DUMPING-STABILITY & RESILIENCY IN EXPERIMENTAL ECOSYSTEM | NIXON, SCOTT W. | 803143020 | CONT | 06/17/75 | 54,629 |
| RHODE ISLAND, UNIV. OF<br>KINGSTON | WATER<br>ROLE OF POLYAMINES IN ADAPTATION OF COLIFORMS TO THE GI TRACT | COHEN, PAUL S. | 803255020 | CONT | 06/02/75 | 20,495 |
| RHODE ISLAND, UNIV. OF<br>KINGSTON | WATER<br>PREPARATION OF FLUORESCENT CITRATE & SUICIDE ANALOGS | ROSEN, WILLIAM M. | 803728010 | NEW | 05/19/75 | 14,000 |
| RHODE ISLAND, UNIV. OF<br>KINGSTON | WATER<br>NUTRITIONAL REQUIREMENTS OF MARINE LARVAL & JUVENILE FISH | SIMPSON, KENNETH L. | 803818010 | NEW | 06/12/75 | 25,000 |
| ** DEMONSTRATION ** | | | | | | |
| RHODE ISLAND SOLID WASTE MGMT. CORP.<br>PROVIDENCE | COMPREHENSIVE<br>ENERGY RECOVERY IMPLEMENTATION PROJECT | POWERS, WILLIAM E. | 804069010 | NEW | 06/30/75 | 50,000 |
| ** FELLOWSHIPS ** | | | | | | |
| BROWN UNIV.<br>PROVIDENCE | AIR<br>COMPUTER SCIENCE/STATISTICS | NOLAN, JAMES | 910507010 | NEW | 05/19/75 | 1,230 |
| RHODE ISLAND, UNIV. OF<br>KINGSTON | AIR<br>ANALYTICAL CHEMISTRY | CUCCO, JOHN ANTHONY | 910520010 | NEW | 01/16/75 | 836 |

## SOUTH CAROLINA

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| BENEDICT COLLEGE<br>COLUMBIA | COMPREHENSIVE<br>TRACE METALS & INORGANIC SPECIES EFFLUENTS: KINETIC & STABILITY STUDIES | KINARD, JAMES | 803490010 | NEW | 01/20/75 | 26,549 |
| CLEMSON UNIV.<br>CLEMSON | WATER<br>WORKSHOP ON RESEARCH NEEDS IN AUTOMATION OF WASTEWATER TREATMENT SYSTEMS | ANDREWS, JOHN F. | 803214013 | INCR | 05/15/75 | 2,300 |
| CLEMSON UNIV.<br>CLEMSON | WATER<br>ENERGY CONSER. BY POINT SOURCE RECYCLE W/HIGH TEMPERATURE HYPERFILTRATION | BISHOP, EUGENE H. | 803875010 | NEW | 06/18/75 | 161,000 |
| SOUTH CAROLINA, UNIV. OF<br>COLUMBIA | WATER<br>PALEOENVIRONMENT-PREDICTOR OF ENVRN. IMPACT OF COAL EXTRACTION | CARUCCIO, FRANK | 803895010 | NEW | 06/09/75 | 159,488 |
| ** DEMONSTRATION ** | | | | | | |
| CLEMSON UNIV.<br>CLEMSON | WATER<br>UTILIZATION OF CATTLE FEEDLOT WASTES THROUGH LAND APPLICATIONS | BARTH, CLYDE L. | 803414010 | NEW | 06/04/75 | 349,161 |
| SOUTH CAROLINA TEXTILE MANUF. ASSOC.<br>COLUMBIA | WATER<br>MOBILE HYPERFILTRATION DEMONSTRATION LAB. | COCOROS, GEORGE | 802973013 | INCR | 04/16/75 | 50,000 |
| SOUTH CAROLINA, UNIV . OF<br>COLUMBIA | WATER<br>DEMONSTRATION & EVALUATION OF SEDIMENT & EROSION CONTROL TECHNIQUES | CARUCCIO, FRANK T. | 803724011 | INCR | 06/20/75 | 93,000 |
| | | | 803724010 | NEW | 05/02/75 | 96,000 |
| TEXIZE CHEMICALS CO.<br>GREENVILLE | WATER<br>PERFORMANCE OF ROTATING BIOLOGICAL CONTRACTOR ON LIQUID DETERGENT PLANT | MILESKI, STANLEY E. | 803892010 | NEW | 06/25/75 | 30,000 |
| ** TRAINING ** | | | | | | |
| CLEMSON UNIV.<br>CLEMSON | WATER<br>CRITERIA FOR ESTABLISHMENT OF TWO YEAR HIGH SCHOOL WASTEWATER TECHNOLOGY | AUSTIN, JOHN H. | 900168052 | INCR | 05/13/75 | 15,012 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | | S O U T H   C A R O L I N A | | | | |
| ** TRAINING ** | | | | | | |
| CLEMSON UNIV.<br>CLEMSON | WATER<br>FOUR-YEAR WATER & WASTEWATER TECHNOLOGY CURRICULUM DEVELOPMENT | CHISMAN, JAMES A. | 900660010 | NEW | 06/17/75 | 30,000 |
| CLEMSON, UNIV.<br>CLEMSON | WATER<br>INTERDISCIPLINARY EDUCATION IN ENVRN. SYSTEMS MGMT. | RICH, LINVIL G. | 900146073 | INCR | 03/14/75 | 13,091 |
| GREENVILLE TECH. EDUC. CTR.<br>GREENVILLE | WATER<br>WASTEWATER TECHNOLOGY TRAINING PROGRAM | HYLAND, WILLIAM E. | 900109050 | CONT | 05/13/75 | 25,000 |
| ** FELLOWSHIPS ** | | | | | | |
| SOUTH CAROLINA, UNIV. OF<br>COLUMBIA | WATER<br>M.S./PUBLIC ADMINISTRATION | MCCULLOUGH, LARRY E. | 910667010 | NEW | 06/16/75 | 5,025 |
| SOUTH CAROLINA, UNIV. OF<br>COLUMBIA | WATER<br>M.S./PUBLIC HEALTH | KINNEY, RONALD W. | 910669010 | NEW | 05/29/75 | 2,577 |
| SOUTH CAROLINA, UNIV. OF<br>COLUMBIA | WATER<br>M.S./PUBLIC HEALTH | DAVIS, JANET E. | 910670010 | NEW | 05/29/75 | 2,577 |

## SOUTH DAKOTA

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| SOUTH DAKOTA STATE UNIV.<br>BROOKINGS | WATER<br>ANIMAL WASTE MGMT. IN NORTHERN GREAT PLAINS: AFFECT ON SOIL & RUNOFF H2O | WIERSMA, JOHN L. | 803662010 | NEW | 03/21/75 | 38,292 |
| SOUTH DAKOTA STATE UNIV.<br>BROOKINGS | WATER<br>INFILTRATION LAND TREATMENT OF STABILIZATION POND EFFLUENT | DORNBUSH, JAMES N. | 803804010 | NEW | 05/14/75 | 48,700 |

## T E N N E S S E E

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| VANDERBILT UNIV.<br>NASHVILLE | WATER<br>REMOVAL OF HEAVY METALS & FLUORIDE FROM WASTEWATERS BY FOAM FLOTATION | WILSON, DAVID | 803564010 | NEW | 01/16/75 | 20,000 |
| VANDERBILT UNIV.<br>NASHVILLE | WATER<br>DEVELOPMENT OF A BIO. SIMULATION MONITOR FOR MUN./IND. TREATMENT SYSTEM | ECKENFELDER, W. W. | 803740010 | NEW | 04/22/75 | 102,473 |
| VANDERBILT UNIV.<br>NASHVILLE | PESTICIDES<br>METABOLISM & TOXIC EFFECTS OF DITHIOCARBAMATE FUNGICIDES IN THE RAT | NEAL, ROBERT A. | 803914010 | NEW | 06/04/75 | 44,994 |
| ** TRAINING ** | | | | | | |
| TENNESSEE DEPT. OF PUBLIC HEALTH<br>NASHVILLE | WATER<br>WASTEWATER TREATMENT PLANT OPERATOR TRAINING | HUGHES, JACK | 900358013 | INCR | 06/06/75 | 10,000 |
| ** FELLOWSHIPS ** | | | | | | |
| EAST TENNESSEE STATE UNIV.<br>JOHNSON CITY | AIR<br>AIR POLLUTION | CATLETT, RONNIE | 910476011 | INCR | 01/16/75 | 72 |
| EAST TENNESSEE STATE UNIV.<br>JOHNSON CITY | AIR<br>M.S./ENVRN. HEALTH | DIXON, RAYMOND C. | 910660010 | NEW | 06/04/75 | 8,494 |
| TENNESSEE, UNIV. OF<br>KNOXVILLE | AIR<br>M.S./CIVIL ENGR. | DEVIN, MAURICE R. | 910536010 | NEW | 05/28/75 | 4,237 |
| TENNESSEE, UNIV. OF<br>KNOXVILLE | AIR<br>M.S./ENVRN. ENGR. | CLAGGETT, STEVEN M. | 910537010 | NEW | 05/29/75 | 4,237 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | TEXAS | | | | | |
| ** RESEARCH ** | | | | | | |
| BAYLOR COLLEGE OF MEDICINE<br>HOUSTON | WATER<br>NEW & IMPROVED METHODS QUANTITATIVE DETECTION OF ENTERIC VIRUSES IN WATER | MELNICK, JOSEPH L. | 802736023 | INCR | 04/10/75 | 41,000 |
| HOUSTON, UNIV. OF<br>HOUSTON | AIR<br>SIMULATION OF GROUND LEVEL CONCENTRATION USING INDICATOR FILM | WORLEY, FRANK L. | 803576010 | NEW | 02/21/75 | 22,000 |
| JUAREZ LINCOLN CENTER<br>AUSTIN | PESTICIDES<br>PESTICIDE ABUSE INJURIOUS TO FARMWORKERS RESEARCH PROJECT | FRANKLIN, JUDY | 803985010 | NEW | 05/05/75 | 40,000 |
| NORTH TEXAS STATE UNIV.<br>DENTON | WATER<br>IDENTIFICATION OF CHLORINATED ORGANICS FORMED DURING WW CHLORINATION | GLAZE, WILLIAM H. | 803007020 | CONT | 01/30/75 | 49,168 |
| RICE UNIV.<br>HOUSTON | PESTICIDES<br>BIOCIDE RESIDUES IN A MAKSHLAND-ESTUARY ECOSYSTEM | FISHER, FRANK M. | 801185023 | INCR | 06/27/75 | 15,000 |
| SOUTHWEST FDN. FOR RES. & EDUC.<br>SAN ANTONIO | AIR<br>IN VITRO ASSAY OF RELATIVE TOXICITY OF DIESEL-ENGINE EXHAUSTS | MELTZ, MARTIN | 803705010 | NEW | 06/04/75 | 59,494 |
| TEXAS A&M RES. FDN.<br>COLLEGE STATION | WATER<br>ACCUMULATION & PASSAGE OF POLLUTANTS IN SEPTIC TANK DISPOSAL FIELDS | BROWN, KIRK W. | 802955014 | INCR | 03/27/75 | 44,942 |
| | | | 802955020 | CONT | 06/26/75 | 50,000 |
| TEXAS A&M RES. FDN.<br>COLLEGE STATION | COMPREHENSIVE<br>STRUCTURE & REACTIVITY OF ABSORBED OXIDES OF SULFUR | LUNSFORD, JACK H. | 801136052 | INCR | 05/29/75 | 10,000 |
| TEXAS A&M UNIV.<br>COLLEGE STATION | WATER<br>SEWAGE DISPOSAL ON LAND: CHEMICAL & MICROBIOLOGICAL IMPLICATIONS | WEAVER, RICHARD W. | 803281010 | NEW | 03/31/75 | 262,601 |
| | | | 803281011 | INCR | 05/14/75 | 6,221 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | T E X A S | | | | | |
| ** RESEARCH ** | | | | | | |
| TEXAS A&M UNIV.<br>COLLEGE STATION | WATER<br>SALMONELLAE IN FEEDLOT MANURE & ITS SURVIVAL & MOVEMENT IN SOIL | WEAVER, RICHARD W. | 803344010 | NEW | 02/26/75 | 59,279 |
| | | | 803344011 | INCR | 05/14/75 | 9,299 |
| TEXAS A&M UNIV.<br>COLLEGE STATION | PESTICIDES<br>A PROGRAM FOR THE CONTROL OF URBAN COCKROACHES | FRANKIE, GORDON WM. | 803068020 | CONT | 06/02/75 | 30,414 |
| TEXAS SOUTHERN UNIV.<br>HOUSTON | COMPREHENSIVE<br>NEW CATALYTIC AGENTS TO DETERMINE CHEMICAL OXYGEN DEMAND IN WASTEWATER | WILSON, RAY F. | 803779010 | NEW | 06/17/75 | 26,725 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>DYNAMICAL THEORIES OF KNUDSEN AEROSOLS | BROCK, JAMES R. | 800871094 | INCR | 04/08/75 | 4,000 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>AEROSOL DYNAMICS | BROCK, JAMES R. | 803660010 | NEW | 05/21/75 | 30,000 |
| | | | 803660011 | INCR | 06/02/75 | 40,000 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>REACTIONS OF SULFUR DIOXIDE IN AEROSOLS | HIMMELBLAU, DAVID M. | 803814010 | NEW | 06/24/75 | 50,000 |
| TEXAS, UNIV. OF<br>AUSTIN | WATER<br>BIOLOGICAL COUNTERMEASURES TO MITIGATE THE EFFECTS OF HAZARDOUS MATERIALS | ARMSTRONG, NEAL E. | 802207013 | INCR | 01/03/75 | 80,000 |
| TEXAS, UNIV. OF<br>DALLAS | WATER<br>ALGAL NUTRIENT AVAILABILITY & LIMITATIONS IN LAKE ONTARIO DURING IFYGL | LEE, G. FRED | 803642010 | NEW | 03/03/75 | 11,000 |
| TEXAS, UNIV. OF<br>SAN ANTONIO | WATER<br>HUMAN ENTERIC VIRUS SURVIVAL IN SOIL FOLLOWING IRRIGATION WITH EFFLUENTS | SAZIK, BERNARD P. | 803844010 | NEW | 06/26/75 | 71,774 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | TEXAS | | | | | |
| ** RESEARCH ** | | | | | | |
| TEXAS, UNIV. OF<br>AUSTIN | PESTICIDES<br>CHARACTERIZATION OF SHRIMP BACULOVIRUS | SUMMERS, MAX D. | 803395012 | INCR | 05/19/75 | 6,680 |
| TEXAS, UNIV. OF<br>AUSTIN | PESTICIDES<br>DEVELOPMENT & STANDARDIZATION OF IDENTIFICATION & MONITORING TECHNIQUES | SUMMERS, MAX D. | 803666010 | NEW | 03/03/75 | 96,548 |
| ** DEMONSTRATION ** | | | | | | |
| INST. FOR STORM RES.<br>HOUSTON | SOLID WASTE<br>DENTON LANDFILL PROJECT | STANFORD, GEOFFREY | 804157010 | NEW | 06/25/75 | 150,000 |
| RICE UNIV.<br>HOUSTON | WATER<br>MAXIMUM UTILIZATION OF WATER RESOURCES IN A PLANNED COMMUNITY | CHARACKLIS, W. G. | 802433016 | INCR | 06/02/75 | 161,000 |
| TEXAS A&M UNIV.<br>COLLEGE STATION | WATER<br>THE CONTROL OF NITRATES AS A WATER POLLUTANT | SWOBODA, ALLEN R. | 800193030 | CONT | 02/19/75 | 64,537 |
| | | | 800193031 | INCR | 05/02/75 | 8,220 |
| TEXAS A&M UNIV.<br>COLLEGE STATION | WATER<br>MGMT GUIDELINES TO PREVENT POLLUTION IRRIGATION RETURN FLOW IN RICE FIELD | BROWN, KIRK W. | 802008030 | CONT | 01/03/75 | 62,925 |
| TEXAS TECH UNIV.<br>LUBBOCK | WATER<br>SYNTHESIS GAS FROM MANURE | HALLIGAN, JAMES E. | 802934012 | INCR | 04/21/75 | 40,000 |
| ** TRAINING ** | | | | | | |
| RICE UNIV.<br>HOUSTON | WATER<br>TRAINING IN WATER SUPPLY & POLLUTION CONTROL | WARD, C. H. | 900175074 | INCR | 01/23/75 | 29,688 |
| TEXAS A&M UNIV.<br>COLLEGE STATION | WATER<br>ADVANCED WWT UNIT PROCESS OPERATIONS/ CALIF. | WOLF, HAROLD W. | 900443014 | INCR | 06/06/75 | 32,026 |

## T E X A S

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** TRAINING ** | | | | | | |
| TEXAS A&M UNIV.<br>COLLEGE STATION | WATER<br>LABORATORY ANALYTICAL METHODS IN ENVRN. ENGR. | WOLF, HAROLD | 900521011 | INCR | 04/10/75 | 25,008 |
| TEXAS, UNIV. OF<br>HOUSTON | AIR<br>GRADUATE PROGRAM IN AIR QUALITY MANAGEMENT | PIER, STANLEY M. | 900330030 | CONT | 02/05/75 | 39,020 |
| ** FELLOWSHIPS ** | | | | | | |
| ST. MARY'S UNIV.<br>SAN ANTONIO | WATER<br>J.D./ENVRN. LAW | FORRESTER, CARL X. | 910677010 | NEW | 06/16/75 | 6,500 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>M.S./ENVRN. HEALTH ENGR./AIR POLLUTION | SIEVERS, HENRY E. | 910386012 | INCR | 05/29/75 | 499 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>M.S./ENVRN. ENGR. | CARAWAY, JAMES C. | 910395012 | INCR | 05/28/75 | 499 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>M.S./ENVRN. HEALTH ENGR. | SPAW, STEVEN N. | 910428012 | INCR | 05/29/75 | 603 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>PH.D./ENVRN. HEALTH ENGR. | WAID, KENNETH | 910429012 | INCR | 05/29/75 | 656 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>M.S./ENVRN. HEALTH ENGR. | MYERS, JAMES C. | 910430012 | INCR | 05/29/75 | 603 |
| TEXAS, UNIV. OF<br>AUSTIN | AIR<br>M.S./ENVRN. HEALTH ENGR. | DEMO, JERRY M. | 910517010 | NEW | 01/22/75 | 750 |
| TEXAS, UNIV. OF<br>RICHARDSON | AIR<br>ENVRN. SCI. | ARGENTO, VITTORIO K. | 910539010 | NEW | 05/19/75 | 707 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| T E X A S | | | | | | |
| ** FELLOWSHIPS ** | | | | | | |
| TEXAS, UNIV. OF<br>RICHARDSON | AIR<br>M.S./AIR POLLUTION | EDGAR, ROBERT T. | 910620010 | NEW | 06/04/75 | 4,000 |
| TEXAS, UNIV. OF<br>AUSTIN | WATER<br>ENVRN. HEALTH ENGR. | WHEELER, CARL L. | 910346012 | INCR | 06/17/75 | 88 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | U T A H | | | | | |
| ** RESEARCH ** | | | | | | |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>BIOSTIMULATION & NUTRIENT ASSESSMENT SYMPOSIUM | MIDDLEBROOKS, E. JOE | 803523010 | NEW | 01/03/75 | 14,000 |
| UTAH STATE UNIV.<br>LOGAN | PESTICIDES<br>ISOLATION, CHARACTERIZATION, PATHOGENICITY & APPLICATION OF WEEVIL VIRUS | GOUSSEF, NABIL N. | 803058020 | CONT | 06/02/75 | 29,818 |
| UTAH, UNIV. OF<br>SALT LAKE CITY | AIR<br>AIR POLLUTANT SORPTION BY VEGETATION IN THE UNITED STATES | HILL, A. CLYDE | 802967020 | CONT | 03/06/75 | 94,204 |
| UTAH, UNIV. OF<br>SALT LAKE CITY | WATER<br>ECOLOGY OF PLECOPTERA (STONEFLIES) | GAUFIN, ARDEN R. | 803537010 | NEW | 03/03/75 | 9,907 |
| ** TRAINING ** | | | | | | |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>GRADUATE TRAINING PROGRAM IN RURAL & AGRICULTURAL WATER QUALITY MGMT. | JONES, NORMAN B. | 900069062 | INCR | 04/14/75 | 28,928 |
| ** FELLOWSHIPS ** | | | | | | |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>M.S./ENGR. | SMITH, GAYLE J. | 910616010 | NEW | 04/30/75 | 1,300 |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>M.S./ENGR. | NOBLE, KARL R. | 910622010 | NEW | 05/05/75 | 1,400 |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>M.S./ENGR. | THOMAS, WAYNE S. | 910631010 | NEW | 05/05/75 | 1,200 |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>M.S./ENGR. | MIZE, LARRY J. | 910633010 | NEW | 05/05/75 | 1,400 |
| UTAH STATE UNIV.<br>LOGAN | WATER<br>WATER POLLUTION CONTROL | PEHRSON, FREDRICK C. | 910638010 | NEW | 05/14/75 | 1,400 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** FELLOWSHIPS ** | | | | | | |
| UTAH, UNIV. OF<br>SALT LAKE CITY | WATER<br>PH.D./WATER QUALITY MGMT. | SOWBY, STEPHEN E. | 910432011 | INCR | 05/15/75 | 2,280 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| V E R M O N T | | | | | | |
| ** RESEARCH ** | | | | | | |
| VERMONT, UNIV. OF<br>BURLINGTON | WATER<br>ALTERNATE METHODS OF MANURE HANDLING | MAGDOFF, FREDERICK R. | 803883010 | NEW | 05/15/75 | 38,174 |
| ** FELLOWSHIPS ** | | | | | | |
| VERMONT, UNIV. OF<br>BURLINGTON | AIR<br>M.S./CIVIL ENGR. | BARBOZA, MICHAEL J. | 910650010 | NEW | 06/04/75 | 8,005 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| V I R G I N I A | | | | | | |
| ** RESEARCH ** | | | | | | |
| CENTER FOR RESPONSIVE TECH.<br>MCLEAN | COMPREHENSIVE<br>NASA/EPA RESEARCH & DEVELOPMENT INTERAGENCY PLAN | FRANCIS, DAVID D. | 803287013 | INCR | 02/11/75 | 24,960 |
| MITRE CORP.<br>MCLEAN | WATER<br>CONTROL OF WATER POLLUTION FROM HYDROLOGIC MODIFICATIONS | TRUETT, BRUCE | 802310014 | INCR | 02/19/75 | 5,700 |
| ST. PAULS COLLEGE<br>LAWRENCEVILLE | COMPREHENSIVE<br>MATHEMATICAL FORMULATION & ANALYSIS OF PESTICIDE ATTENUATION SUB-MODELS | YATES, JERREL | 804016010 | NEW | 06/17/75 | 20,223 |
| VIRGINIA INST. OF MARINE SCIENCE<br>GLOUCESTER PT. | WATER<br>APPLICATION OF CLASSIFICATION IN ECOLOGICAL STUDIES OF WATER POLLUTION | BOESCH, DONALD F. | 803599010 | NEW | 01/17/75 | 13,956 |
| VIRGINIA INST. OF MARINE SCIENCE<br>GLOUCESTER PT. | PESTICIDES<br>SUBLETHAL EFFECTS OF CHLORINE ON VASCULAR PLANTS & DECAPOD CRUSTACEANS | ROBERTS, MORRIS H. | 803872010 | NEW | 06/13/75 | 62,000 |
| ** DEMONSTRATION ** | | | | | | |
| RICHMOND, CITY OF<br>RICHMOND | COMPREHENSIVE<br>SOLID WASTE MANAGEMENT/RESOURCE RECOVERY SYSTEM | WILKINSON, C. F. | 804073010 | NEW | 06/30/75 | 50,000 |
| VIRGINIA STATE WATER CONTROL BD.<br>RICHMOND | WATER<br>CONTROL OF HEAVY METALS IN CONTRARY CREEK | JENSEN, EUGENE T. | 803801010 | NEW | 06/13/75 | 225,158 |
| ** FELLOWSHIPS ** | | | | | | |
| VIRGINIA, UNIV. OF<br>CHARLOTTESVILLE | WATER<br>PH.D. | GREGORY, HELEN J. | 910644010 | NEW | 04/29/75 | 6,500 |

## WASHINGTON

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| SEATTLE, MUN. OF METRO.<br>SEATTLE | WATER<br>DISPOSAL OF STABILIZED MUNICIPAL INDUSTRIAL SLUDGE IN THE FOREST ENVRN. | MATTHEWS, ROBERT R. | 802172020 | CONT | 02/11/75 | 78,000 |
| WASHINGTON STATE DEPT. OF FISHERIES<br>OLYMPIA | WATER<br>FIELD VERIFICATION OF LAB RESULTS W/ BIVALVE LARVAE BIOASSAYS | WOELKE, CHARLES E. | 800905030 | CONT | 06/02/75 | 50,000 |
| WASHINGTON STATE UNIV.<br>PULLMAN | AIR<br>BIOLOGICAL SURFACE SCAVENGING OF AIR POLLUTANTS | RASMUSSEN, REINHOLD | 802565020 | CONT | 01/28/75 | 35,000 |
| WASHINGTON, UNIV. OF<br>SEATTLE | AIR<br>OPTICAL EFFECTS OF ATMOSPHERIC AEROSOL | WAGGONER, ALAN | 800665110 | NEW | 01/27/75 | 95,000 |
| WASHINGTON, UNIV. OF<br>SEATTLE | AIR<br>ANALYSIS OF AIR POLLUTION BY MASS SPECTROSCOPY | CRITTENDEN, ALDEN L. | 801119033 | INCR | 06/17/75 | 3,617 |
| WASHINGTON, UNIV. OF<br>SEATTLE | AIR<br>PLUME OPACITY RELATED TO PARTICLE SIZE & CHEMICAL COMPOSITION | PILAT, MICHAEL J. | 803897010 | NEW | 06/17/75 | 27,000 |
| WASHINGTON, UNIV. OF<br>SEATTLE | WATER<br>CHEMICAL INHIBITION | PAVLOU, SPYROS P. | 800362040 | CONT | 05/19/75 | 78,272 |
| WASHINGTON, UNIV. OF<br>SEATTLE | WATER<br>RETENTION OF POLLUTANTS IN FJORDS | WINTER, DONALD F. | 801320030 | CONT | 02/20/75 | 48,000 |
| WASHINGTON, UNIV. OF<br>SEATTLE | WATER<br>TROPHIC EQUILIBRIUM OF LAKE WASHINGTON | EDMONDSON, W. THOMAS | 802082030 | CONT | 04/29/75 | 32,000 |
| ** DEMONSTRATION ** | | | | | | |
| BOEING CO.<br>SEATTLE | WATER<br>REGENERATION OF CHROMATED ALUMINUM DEOXIDIZERS | JARMUTH, R. A. | 803064014 | INCR | 03/20/75 | 7,125 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | W A S H I N G T O N | | | | | |
| ** DEMONSTRATION ** | | | | | | |
| BOEING CO.<br>SEATTLE | WATER<br>AIRCRAFT FACTORY WASTEWATER RECYCLING-PILOT SCALE DEMONSTRATION | ROBINSON, A. K. | 803073011 | INCR | 06/30/75 | 9,000 |
| SKOKOMISH INDIAN TRIBE<br>SHELTON | WATER<br>SKOKOMISH SALMON PROCESSING PLANT WASTEWATER TREATMENT SYSTEMS | SMITH, WILLIAM L. | 803911010 | NEW | 06/23/75 | 56,600 |
| ** FELLOWSHIPS ** | | | | | | |
| WASHINGTON STATE UNIV.<br>PULLMAN | AIR<br>M.S./ENVRN. ENGR. | YAKE, WILLIAM E. | 910588010 | NEW | 06/26/75 | 1,129 |
| WASHINGTON STATE UNIV.<br>PULLMAN | WATER<br>M.S./ENVRN. SCI. | CHRISTIE, MICHAEL A. | 910599010 | NEW | 04/21/75 | 6,500 |
| WASHINGTON, UNIV. OF<br>SEATTLE | AIR<br>M.S./ENGR. | RUBY, MICHAEL G. | 910601010 | NEW | 06/04/75 | 4,662 |
| WASHINGTON, UNIV. OF<br>SEATTLE | WATER<br>M.S./WATER QUALITY CONTROL | ANDERSON, KATHLEEN M. | 910626010 | NEW | 04/30/75 | 6,500 |

## W E S T   V I R G I N I A

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** RESEARCH ** | | | | | | |
| WEST VIRGINIA MINING&RECLAMATION ASSOC<br>CHARLESTON | WATER<br>ENVIRONMENTAL IMPACT OF STEEP SLOPE MINING | LUSK, BEN E. | 803224010 | NEW | 04/25/75 | 70,000 |
| WEST VIRGINIA UNIV.<br>MORGANTOWN | WATER<br>EVALUATION OF REVERSE OSMOSIS PROCESS UTILIZED FOR TREATMENT OF DRAINAGE | BLACKSHAW, G. LANSING | 803716010 | NEW | 06/27/75 | 174,766 |
| WEST VIRGINIA UNIV.<br>MORGANTOWN | PESTICIDES<br>EFFECT OF PESTICIDE INTERACTIONS UPON THE REPRODUCTIVE SYSTEM | THOMAS, JOHN A. | 803578010 | NEW | 01/10/75 | 30,282 |
| WEST VIRGINIA, UNIV. OF<br>MORGANTOWN | WATER<br>FIELD & LAB. METHODS APPLICABLE TO OVERBURDENS & MINESOILS | SMITH, RICHARD | 803508010 | NEW | 02/28/75 | 99,860 |
| ** DEMONSTRATION ** | | | | | | |
| SOUTH CHARLESTON CITY SAN. BD.<br>SOUTH CHARLESTON | WATER<br>CO-DISPOSAL OF SEWAGE SLUDGE & MUNICIPAL REFUSE | POE, ALFRED | 803769010 | NEW | 06/09/75 | 150,000 |
| WEST VIRGINIA MINING&RECLAMATION ASSOC<br>CHARLESTON | WATER<br>NEW SURFACE MINING TECHNOLOGY TO MINIMIZE ENVIRONMENTAL DISTURBANCE | LUSK, BEN E. | 802732030 | CONT | 06/09/75 | 635,000 |
| ** FELLOWSHIPS ** | | | | | | |
| WEST VIRGINIA COLLEGE GRADUATE STUDIES<br>INSTITUTE | WATER<br>ENVRN. STUDIES | ISLAM, NURUL | 910534010 | NEW | 03/17/75 | 3,250 |
| WEST VIRGINIA COLLEGE OF GRAD STUDIES<br>INSTITUTE | WATER<br>M.S./ENGR. | BURT, RICHARD M. | 910585010 | NEW | 04/21/75 | 3,250 |
| WEST VIRGINIA UNIV.<br>MORGANTOWN | AIR<br>CHEMICAL ENGR. | LOGAN, WILLIAM JOHN | 910645010 | NEW | 05/19/75 | 6,575 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | W I S C O N S I N | | | | | |
| ** RESEARCH ** | | | | | | |
| INST. OF PAPER CHEMISTRY<br>APPLETON | WATER<br>COMBINED MEMBRANE & FREEZING CONCENTRATION OF BLEACHING RECYCLE WATERS | WILEY, AVERILL J. | 803525010 | NEW | 01/23/75 | 150,000 |
| WISCONSIN, UNIV. OF<br>SUPERIOR | WATER<br>INFLUENCE OF TURBIDITY ON FISH ABUNDANCE IN WESTERN LAKE SUPERIOR | SWENSON, WILLIAM A. | 802455030 | CONT | 03/25/75 | 30,888 |
| WISCONSIN, UNIV. OF<br>MADISON | WATER<br>NUTRITION OF GREAT LAKES CLADAPHORA | GERLOFF, GERALD C. | 802464022 | INCR | 04/30/75 | 13,777 |
| WISCONSIN, UNIV. OF<br>STEVENS POINT | WATER<br>NON POINT POLLUTION IN RELATION TO EUTROPHICATION & OXYGEN DEPLETION | SHAW, BYRON | 803547010 | NEW | 02/11/75 | 32,000 |
| WISCONSIN, UNIV. OF<br>SUPERIOR | WATER<br>INFLUENCE OF LAKE RESTORATION ON THE FISHERY RESOURCE OF SHAGAWA LAKE | SWENSON, WILLIAM A. | 803673010 | NEW | 03/25/75 | 21,819 |
| WISCONSIN, UNIV. OF<br>OSHKOSH | WATER<br>EXPERIMENTAL USE OF EMERGENT VEGETATION FOR BIO. TREATMENT OF MUN. WASTE | SPANGLER, FRED L. | 803794010 | NEW | 05/21/75 | 75,000 |
| WISCONSIN, UNIV. OF<br>MADISON | WATER<br>PERFORMANCE EVALUATION OF EXISTING AERATED LAGOON SYSTEM OF KOSHKONONG | POLKOWSKI, LAWRENCE B. | 803930010 | NEW | 06/13/75 | 90,000 |
| WISCONSIN, UNIV. OF<br>SUPERIOR | WATER<br>STATIC COAL STORAGE BIOLOGIC & CHEMICAL EFFECTS ON AQUATIC ENVRN. | COWARD, NATHAN A. | 803937010 | NEW | 06/04/75 | 59,325 |
| WISCONSIN, UNIV. OF<br>MADISON | PESTICIDES<br>MECHANISMS OF PESTICIDE DEGRADATION | MATSUMURA, FUMIO | 801060110 | CONT | 03/06/75 | 47,974 |
| WISCONSIN, UNIV. OF<br>MADISON | COMPREHENSIVE<br>THE IMPACT OF COAL FIRED POWER PLANTS ON THE ENVIRONMENT | CLAPP, JAMES L. | 803971010 | NEW | 06/26/75 | 633,828 |
| ** DEMONSTRATION ** | | | | | | |
| MILWAUKEE CITY SEWERAGE COMM.<br>MILWAUKEE | WATER<br>FULL SCALE EVALUATION OF TOP FEED VACUUM FILTRATION FOR DEWATERING WASTE | ERNEST, LAWRENCE A. | 800969011 | INCR | 05/02/75 | 250,000 |

## W I S C O N S I N

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| ** TRAINING ** | | | | | | |
| WISCONSIN, UNIV. OF<br>MADISON | WATER<br>WATER RESOURCES MANAGEMENT PROGRAM | FALKNER, CHARLES H. | 900118053 | INCR | 04/29/75 | 66,906 |
| WISCONSIN, UNIV. OF<br>MILWAUKEE | WATER<br>EXPANSION OF UNDERGRAD PROGRAM IN DESIGN, OPERATION & MAINTENANCE | BACON, VINTON W. | 900124050 | CONT | 06/25/75 | 28,286 |
| ** FELLOWSHIPS ** | | | | | | |
| WISCONSIN, UNIV. OF<br>MADISON | AIR<br>M.S./CHEMICAL ENGR. | MITRO, SUBROTO | 910535010 | NEW | 05/21/75 | 6,001 |
| WISCONSIN, UNIV. OF<br>MADISON | AIR<br>M.S./APC | SAMSON, PERRY J. | 910586010 | NEW | 05/21/75 | 7,459 |
| WISCONSIN, UNIV. OF<br>MADISON | AIR<br>M.S./ENVRN. ENGR. | WILKENING, KENNETH E. | 910624010 | NEW | 06/23/75 | 3,816 |
| WISCONSIN, UNIV. OF<br>MADISON | WATER<br>M.S./GEOLOGY/WATER RESOURCES MGMT. | BECKER, RONALD W. | 910634010 | NEW | 04/30/75 | 6,500 |
| WISCONSIN, UNIV. OF<br>MADISON | WATER<br>M.S./CIVIL ENGR. | SCHUFF, RICHARD G. | 910637010 | NEW | 05/21/75 | 6,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| | W Y O M I N G | | | | | |
| ** RESEARCH ** | | | | | | |
| WYOMING, UNIV. OF<br>LARAMIE | WATER<br>LAND APPLICATION OF WASTE WATER UNDER HIGH ALTITUDE CONDITIONS | BURMAN, ROBERT | 803571010 | NEW | 03/31/75 | 63,517 |

## FOREIGN COUNTRIES

### CANADA

** RESEARCH **

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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| MCGILL UNIV.<br>QUEBEC | AIR<br>ACTIVE BINDING OF METAL POLLUTANTS BY NATURAL DIETARY COMPONENTS | SKORYNA, STANLEY C. | 802824021 | INCR | 05/19/75 | 1,000 |
| TORONTO, UNIV. OF<br>TORONTO | AIR<br>INTERNATIONAL CONFERENCE ON HEAVY METALS IN THE ENVIRONMENT | HUTCHINSON, T. C. | 803979010 | NEW | 06/04/75 | 7,500 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
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|  | FOREIGN COUNTRIES<br>FRANCE |  |  |  |  |  |
| ** RESEARCH ** |  |  |  |  |  |  |
| SCIENTIFIC COMM. ON PROBLEMS OF ENVRN.<br>PARIS | WATER<br>EVALUATION OF EXISTING GROUND-WATER BASIN MANAGEMENT MODELS | MALONE, THOMAS F. | 803713010 | NEW | 06/23/75 | 73,056 |

| APPLICANT<br>MUNICIPALITY | MEDIA<br>TITLE | PROJECT DIRECTOR / COMMUNITY REPRESENTATIVE | GRANT NO | TYPE OF GRANT | DATE OF AWARD | AMOUNT OF GRANT AWARD |
|---|---|---|---|---|---|---|
| | FOREIGN COUNTRIES<br>ISRAEL | | | | | |
| ** RESEARCH ** | | | | | | |
| HEBREW UNIV.<br>JERUSALEM | AIR<br>EARLY NEUROTOXICOLOGICAL EFFECTS OF ENVIRONMENTAL EXPOSURE TO LEAD IN AIR | GRUENER, NACHMAN | 803220010 | NEW | 05/21/75 | 20,000 |
| HEBREW UNIV.<br>JERUSALEM | WATER<br>DETECTION OF ENTERIC VIRUSES IN WATER | SHUVAL, HILCEL | 803510010 | NEW | 02/28/75 | 60,000 |
| | | | 803510011 | INCR | 04/29/75 | 24,805 |
| KINNERET LIMNOLOGICAL LAB<br>TIBERIAS | WATER<br>SOURCES OF PHOSPHORUS OF THE PERIDINIUM IN LAKE KINNERET | SERRUYA, COLETTE | 803120020 | CONT | 06/18/75 | 35,000 |

# SECTION II

R800059

The investigation is concerned with the nature, distribution, and origin of the inorganic constituents of coal. This "mineral matter" in coal is, at times, deleterious and may, among other influences, contribute significantly to problems of air and water pollution. In order to obtain a relatively unaltered mineral matter residue as a starting material for our investigations, the technique of electronic low-temperature ashing is routinely used. After ashing the coal at temperatures below 150° C, the mineral matter residues are investigated by X-ray diffraction, and optical and electron microscopy for mineralogical analyses; by X-ray fluorescence spectroscopy atomic absorption spectroscopy, optical emission spectroscopy, neutron activation analyses, and general "wet chemical" methods for elemental analyses; and by sieve analyses and Coulter Counter analyses for size determination.

The major areas of interest, in which investigations are continuing are: 1) the mode of occurrence and distribution of trace elements in coal; especially the mineral phases in which the trace elements are concentrated, 2) the mineralogy and genesis of iron and zinc sulfide minerals in coal seams, 3) high temperature phase relationships of alumino-silicate and other minerals in coal, and 4) mineral distribution within coals of the Illinois Basin. Data from all of the above investigations are then related to the origin and geochemical history of the coal seams.

S800193-03

"Develop practical farming methods which reduce the amount of nitrate which is lost from the soil by leaching and runoff."

Field experiments will be established at different locations to determine the effect time of application has on movement of nitrate out of the root zone. Slow release nitrogen sources, conventional nitrogen sources, nitrification inhibitors, and depth of placement will be incorporated in the study. Crop yield, nitrogen uptake, and soil analysis for nitrogen content will be used as methods of evalution.

"Quantitize the amount of nitrate lost from the soil under various controlled environmental conditions."

Five natural lysimeters are being used to measure the amount of nitrogen leached below four feet from various sources of applied nitrogen. Crop yield and nitrogen uptake are also being used to evaluate the results. A grassland watershed is being used to measure the runoff losses of nitrates from applied fertilizers. Nitrogen uptake by forage and nitrate movement in the soil are being used to evaluate the study.

"Develop certain guidelines for the optimum use of nitrogen fertilizers while limiting the amount of nitrate entering our natural water resources."

Guidelines will be developed from data collected and from published literature for efficient application of nitrogen fertilizers.

## R800276 03

1) OBJECTIVES: - Harding Lake, 46 miles south of Fairbanks, is considered a fine recreational and home site area. It is the only multi-purpose recreational lake available to the general public by road in the Fairbanks area. The lake has some 15 square kilometers in surface area and is 46 meters deep. Land surrounding the lake is owned by federal, state, and private interests. The objectives of this study are:

A) to collect and compile qualitative and quantitative chemical, physical, and biological data by which future variation can be measured.
B) to evaluate and define the above parameters in relation to the limnological future of Harding Lake.

2) PROCEDURES: - Phase II of the project will be completed on March 31, 1975. The project is scheduled for a third year of investigation. The first year of the project was concentrated in establishment and evaluation of sampling sites, methods, and schedules through an abbreviated sampling program. Phase II includes a continued but intensified effort with increased sampling devoted to the winter period.

Included in the investigation are hydrologic and wastewater evaluations in addition to studies of physical, chemical, and biological parameters. Primary production and nutrient chemistry are the main thrust of the research. Second year efforts included aquatic plant evaluations, zooplankton analyses, fish food habit studies, modified nutrient stimulation bioassays and benthic and particulate nutrient analyses. Intensive efforts are to be included during winter (ice conditions). Phase III, the third year of the project, will be devoted to continued investigations, analyses and evaluation of the project data and completion of the project report. A minimized number of wintertime field investigations will be conducted.

## R800362 04

1) Documentation of the multiphase distribution of CH* in selected regions of Puget Sound, 2) identification of the main input sources 3) characterization of the transport mechanism within the ecosystem by correlation analyses involving general water circulation and mass transport, 4) assessment of the phase amplification in this eutrophic estuary by determination of CH mass partition coefficients and comparison with the values determined in coastal zones and oligotrophic regions 5) establishment of critical accumulation levels and toxicity thresholds for representative planktonic species of major abundance in Puget Sound by batch and continuous culture techniques under environmental conditions similar to those encountered in this region and 6) modification of existing simulation models to accommodate additional equations for the representation of the CH distribution in terms of the input and loss rates of the specific phases examined.

R800370

The purpose of this research is to determine the capability of chlorine and certain of its compounds to inactivate viruses in wastewaters and other waters. The inactivation rates due to hypochlorous acid, hypochlorite ion, and monochloramine have thus far been compared, in varying degrees, in pure chlorine demand-free buffer systems (i. e. 0.05 M phosphate and borate buffers). Research during this present grant period will concentrate on clarifying our finding that hypochlorite ion in the borate buffer system (with KCL) was a more effective virucidal form of free chlorine than hypochlorous acid. Further studies will elucidate the effectiveness of free chlorine forms and monochloramine at different temperatures on additional animal viruses, coliphages, and indicator bacteria. Dichloramine disinfection efficiency will also be evaluated, along with further investigation of the effect of temperature (Q10) on the test animal viruses and other microbes.

R 800397

The Select Research Group (SRG) is developing a comprehensive air pollution model designed to enable a control agency to relate air pollution sources to their subsequent distribution in an urban or regional environment. Because progress towards the principal objective requires a broad interdisciplinary effort, the research program has been organized around several integrated subtasks. These include: development of a hydrodynamic model for predicting on a regional basis atmospheric winds and other air pollution-influencing meteorological variables; studies of techniques for modeling atmospheric processes which occur on scales smaller than those evaluated directly by the regional model; development of a closure scheme for the prediction of turbulent fluxes of pollutants; improvement of techniques for remotely sensing and directly measuring meteorological and air pollution parameters in order that the performance of the regional model can be adequately tested and evaluated; studies of the meteorological effects on the properties of air pollutants and pollutant-pollutant interactions; and studies of the removal of air pollutants at the earth's surface.

Significant research completed during the first year of the SRG program included: completion of coding and initiation of testing of the regional numerical model, development and testing of a comprehensive meteorological-air pollution aircraft measurement system, and the design and initial testing of an acoustic sounding system. Aerosol studies have focused on the development and integration of measurement techniques suitable for determining the temporal and spatial variations of both non-hygroscopic and hydroscopic particulates. Special urban, city and rural measurements of atmospheric aerosol using both surface and airborne techniques have been conducted and are being analyzed.

## R800398-15

This work has been planned to elucidate the chemical changes and the primary reaction mechanisms which occur in the simulated, sunlight-irradiated, polluted atmospheres. Three distinct areas of our research are aimed at the attainment of this overall objective: (a) The experimental study of the mechanism of the photo-oxidation of several common contaminants of the urban atmospheres. Specifically a variety of kinetic studies will be made using various combinations of sulfur dioxide, formaldehyde, nitrogen dioxide, nitric oxide, olefin hydrocarbons, and carbon monoxide, both in oxygen-rich mixtures and together with other selected reactants picked to test key points in the photooxidation mechanism. (b) The characterization of the reactive intermediates and transients formed in the irradiated, simulated, polluted atmospheres, and the quantitative determination of certain rate constants for their seemingly important homogeneous thermal reactions. (c) The use of these rate constant data, together with other published kinetic data and computer techniques, to test possible models for the chemical changes observed in these systems. The best kinetic models developed will be employed to simulate the chemical changes which are expected to occur for conditions encountered in real atmospheres. We will attempt to extrapolate these models to predict the effects of changes in pollutant concentrations on the formation of the key products of photochemical smog.

## R800517 03

Agricultural development of acid, sandy Spodosol (Florida flatwood) soils frequently includes establishment of tile or ditch drainage systems to remove excess soil water and thus maintain water-unsaturation in the plant root zone of the soil. Management of citrus on drained flatwood soil normally includes applications of fertilizers, pesticides, and irrigation water. The primary objectives of this project are first to quantitatively assess the water pollution potential of two fertilizers--nitrogen and phosphorus--and three pesticides---terbacil, 2, 4-D, and chlorobenzilate---when applied during routine management of a tile-drained citrus grove located on flatwood soil, and second to evaluate the influence of three soil management schemes---shallow tillage (ST), deep tillage (DT), and deep tillage plus lime (DTL)---upon the water pollution potential of these chemicals. Volumetric discharge rates and chemical analyses of surface runoff and tile-drainage waters will be measured with time. Both measurements will be integrated to determine losses, rates of loss, and time-dependency of loss for each of the 5 applied chemicals. Results from the two years of the study show that discharge of N and P were generally greater in drainage water from the ST treatment than from either DT or DTL plots. Deep tillage resulted in incorporation of clay and organic matter from subsurface layers into the otherwise very sandy surface soil and thus drastically reduced leaching losses of fertilizer-P in outflow from subsurface drains. Application of limestone to deep tilled soil did not significantly influence the quantity of P lost from the soil through subsurface drains. Small quantities of 2, 4-D and terbacil were observed to be leached from ST, DT, and DTL plots; however, chlorobenzilate has not been found in drainage water from any of the plots.

R800637 03

**We propose to study interactions in the metabolism of chlorinated hydrocarbons and hormonal steroids, in order to more clearly define the nature of the interactions and their potential for influencing population dynamics. The methodology developed for one species, the rat, and one pesticide, DDT, will be applicable for testing other species and other chlorinated hydrocarbons.**

**Experiments will compare the excised liver, adrenal and gonadal tissues of DDT-treated and untreated adult rats and adults treated neonatally with DDT with respect to their rates of metabolism of certain hormonal steroids and DDT. Any changes will be correlated with physical changes (body weight, organ weights, and histology) seen in adults of the neonatally-treated groups. Steroids and pesticides and their metabolic products will be measured by gas chromatography, thin-layer chromatography and isotope dilution techniques.**

800656

The research proposed includes the data analysis stage of a major benthic survey. This is the culmination of an 8 year project which has coordinated the efforts of some 45 participating systematists. The project was originally conceived as an investigation of the kinds, abundances, diversity, distribution and groupings of marine benthic animals in relation to particle size and organic content of sediment, depth, temperature and salinity in a cold water environmental about 300 square miles in area on the north side of Cape Cod.

For this purpose Cape Cod Bay was divided into one mile square quadrats in 1965 when the study was begun and 86 of these were marked for sampling. A total of 710 faunal samples were collected. The field work has been completed, the organisms sampled are sorted and are being identified by a large group of collaborating systematists throughout the country, environmental data has been analysed and considerable effort has been invested in the establishment of a variety of computer programs to analyse the results.

The proposed analyses are: community structure, indicator species, diversity, seasonal changes and statistical problems in sampling.

R800665

This research will continue investigation of the effect of atmospheric aerosol properties on visibility through parallel studies in several directly related areas. Activities to date include development of the integrating nephelometer and studies with relating visibility to mass concentration, wavelength dependence of light scattering, spatial distribution of aerosol, humidity, and aerosol chemical composition. Increment development has recently been completed in the last two areas and field experimentation will continue relating chemical composition of aerosols to their in situ physical and optical response to increased humidity. We will continue with analysis and data collected during the fall, 1972, California experiment during which we measured the listed aerosol parameter and other groups measured aerosol size distribution, atmospheric trace gas content, meteorological parameter, etc.

We will participate in a similar joing experiment in St. Louis in August and September of this year. Our experimental goal is to gain further understanding of the interrelationship of 1) the amount, composition and size distribution, 2) the role of water, 3) optical properties of the atmospheric aerosol.

The past four years of research have practical significance based on both technical and scientific results. An integrating nephelometer based on our drawings and patents are being manufactured and is used widely both in scientific research and monitoring visibility degradation. An analog computer circuit that calculates relative humidity room temperature and dew point has been developed for use in our humidity research. New sample collecting and data processing techniques developed in the laboratory will now be applied to the urban environments. It is vital to solve this broad spectrum approach to obtain a useful description of the causes of visibility degradation.

R800675 03

The goal of this investigation is to gain a better understanding of the aqueous chlorine and ozone chemistry involved in wastewater renovation processes. This goal will be accomplished by subjecting selected individual organic components present in wastewater to the conditions of chlorination and ozonation and subsequently isolating and characterizing the products. The toxilogical implications will be carefully monitored by bioassay with suitable aquatic species. Also examined will be product variation produced by changes in the structure of the specific organic, the concentration of the reactants, and the pH of the solution.

S800687 02

PROJECT OBJECTIVES: To evaluate the effects of various irrigation practices on the salinity of irrigation return flows as well as crop production and to demonstrate that improved farm irrigation water management can reduce mineral water quality degradation simultaneously with increasing crop yields and farm profits.

PLAN OF OPERATION: An area of land will be divided into approximately 60 plots, each 100 feet square (10,000 sq. ft.). Each plot will be provided with both an individual drainage system and a solid-set sprinkler irrigation system. The sprinkler system will be designed to permit a variety of controlled irrigation treatments on the crops.

Four crops will be planted and several irrigation treatments will be used on each crop. Measurements will be made of the amounts, timing and quality of both the water applied to the plots and the water leaving as drainage effluent. In addition, both the soil and the water in the soil profile will be sampled at intervals to detect movement and changes of concentrations of salts. Also, crop yields will be measured.

R800861 03

This research study is designed to provide information about effects of ammonia in natural waters on fishes. The study includes: (a) Partial chronic bioassays on rainbow trout (Salmo gairdneri) covering the period of late maturation, spawning, egg hatching, and subsequent fry development. (b) Chronic bioassays on fathead minnows (Pimephales promelas). (c) Acute bioassays on oxygen, and temperature. (d) Exploratory bioassays on the toxicity of ammonia-metal solutions to rainbow trout and fathead minnows. (e) Acute bioassays on regional cold-water invertebrates (e.g., Pteronarcys californica). (f) A field study of a regional trout stream (East Gallatin River) below the outflow of the Bozeman, Montana, sewage treatment plant to investigate possible correlations between ammonia levels and fish and invertebrate distribution. The project started in January 1971 and is scheduled for completion by December 1974.

R 800871

Mathematical descriptions are sought for the evolution of the particle size distribution of the atmospheric aerosol. Refinement where needed of basic theories of aerosol dynamics for coagulation, condensation, diffusion, nucleation, and charging is to be carried out.

The complexity of the equations describing the evolution of the atmospheric aerosols requires a numerical approach involving development of comprehensive computer programs. Refinements in basic theory require solution of the Boltzmann kinetic equation in the vicinity of aerosol particles.

Efficient, accurate computer programs have been developed which permit the simulation of the evolution of the particle size distribution and composition distribution for smog chamber aerosols. Additional work is underway on the evolution of the particle size distribution in stack plumes. Refinements in basic theories will proceed as dictated by sensitivity analysis of numerical simulations.

R800874 04

It is our objective to study chemical reactions of importance in polluted urban atmospheres so that the products, mechanisms, and rates of those reactions can be determined. Steady-state laboratory photolytic techniques are used. Reaction mixtures are irradiated with controlled light sources, and the products of the reaction are monitored continually by mass and infrared spectroscopy. After the irradiation is terminated, a gas chromatographic analysis is made.

During the past year we have studied the following systems:

1. Reaction of $CH_3O_2$ with NO and $NO_2$
2. Photolysis of $H_2O_2$ in the Presence of CO
3. Reaction of HO with $C_2H_4$
4. Photooxidation of $CD_3N_2CD$
5. The Oxidation of $CH_3CO$
6. Reaction of $NH_3$ with $SO_2$

In the coming year we intend to complete our study of HO radicals with $C_2H_4$ and extend the study of HO radicals to $C_3H_6$ and $C_2H_3Cl$. Since the HO-$C_2H_4$ study indicated that $C_2H_4OH$ and $C_2H_3$ radicals are produced we intend to study their oxidation also.

We intend to look at the reactions of peroxyacetyl radicals with NO, $NO_2$, CO, and $SO_2$ to see if the radical can act as an oxidizing agent. In particular the reaction with $NO_2$ should produce peroxyacetyl nitrate (PAN), and we hope to study this reaction in depth.

Finally we will study the dark reaction of $O_3$ with $C_2H_3Cl$ to see if it can be important in the atmosphere. Our initial results indicate that the rate is slower than that of the $O_3$-$C_2H_4$ reaction, but faster than that of the $O_3$-CHClCHCl reaction.

R800881 01

Pathophysiologic and cytostructural effects on guinea pigs from intermittent exposure to ambient levels of nitrogen oxide (0.3 ppm and lower) will be quantitatively measured by newly introduced methodologies, in particular: 1) The cell--alveolus index based on lactate dehydrogenase identification of type II pneumocytes and image analyzer quantitation, 2) protein content of bronchial lavage fluid, 3) urine protein content, 4) acid phosphatase content of gradient densities of lung homogenates 5) diphosphoglycerate content of red blood cells, 6) ultrastructural correlation of homogenate fraction particulates and lung tissue with pathophysiologic findings. In addition, the nature and types of protein lost in lavage fluids and urine will be investigated. The purpose of these studies is to find the lower limits of nitrogen dioxide level and duration of exposure where differences in pathophysiologic and structural findings no longer occur.

The major application of the conclusions from the study will be in the area of assistance for the establishment of air quality standards. At the same time, new basic science data will be obtained and applied to the pathogenesis of environmentally related lung diseases.

800884

1. Objectives - To develop a fluorescence detector for use in gas chromatography which will permit the selective determination of polynuclear arenes and other biological pollutants in the environment at the nanogram level. Automate the equipment and provide data handling features to further increase selectivity and sensitivity of the instrument package.

2. Approach - Incorporate a micro gas flow cell into an existing fluorometric instrument and interface this with the effluent line from a gas chromatograph to provide an additional detector for the system. Automate the wavelength drives for the fluorometer and incorporate the data output into this package.

Current Plans - Evaluate the automated equipment and optimize operation of the package. Determine the best methods of data handling and presentation. Consider adaptation to high pressure liquid chromatograph.

R800905 03

The basic objective of this study is to verify the results of laboratory bioassays of wastes and toxicants with clam and oyster embryos under actual field conditions in both polluted and unpolluted areas. The research will be carried out in two separate, concurrently operating phases.

A. Through laboratory bioassays with clam and oyster embryos:
   1. Determine the environmental requirements of clam and oyster embryos.
   2. Determine the relative toxicity of various toxicants and wastes discharged into marine waters.
   3. Develop a quantitative relationship between clam and oyster embryos and other marine species to several standard toxicants.

B. Through application of in situ bioassays developed with clam and oyster embryos:
   1. Verify laboratory results with bioassays of field waters.
   2. Evaluate the water quality of several areas of Puget Sound during each season of the year.
   3. Determine the horizontal and vertical distribution patterns of toxic wastes presently being discharged in several locations.
   4. Determine whether present water quality criteria are maintaining biologically acceptable water.
   5. Measure biological effects of corrective waste disposal actions to be initiated or now underway in Puget Sound.
   6. Investigate the relationship between waste stream and receiving water toxicity adjacent to several waste outfalls.

800916

The objective of this study is to further investigate the interrelationships among mon-methane hydrocarbon (NMHC), nitric oxide (NO), nitrogen dioxide ($NO_2$), and ozone ($O_3$) as a function of 1) varying initial concentrations of NMHC, $NO_x$, 2) increasing initial percentage of $NO_2$, 3) variable operating conditions such as continuous dilution and variable projile injection of reactants, 4) changing NMHC composition, and 5) presence of other reactive species in simulated photochemical smog. The primary emphasis will be directed toward an empirical sensitivity analysis of the above conditions on the conversion of NO to $NO_2$; the secondary emphasis will be directed toward a similar analysis for ozone behavior. A major goal will be the specification of the effect of hydrocarbon control on $NO_2$ dosage, peak concentration, and rate of formation under a variety of conditions. The relevance of this work for air quality control is to show whether control of NMHC concentration is an efficacious means of controlling the conversion of NO to $NO_2$ and hence effect the formation of $O_3$.

R-800945-02

Laboratory studies have demonstrated the feasibility of using reverse osmosis (RO) for the treatment of rinse waters from a number of different plating baths. However, on a larger scale, there are a number of questions and problems that must be resolved before RO can be applied with confidence to the treatment of electroplating wastes. The objective of the proposed program is to demonstrate, using a full-scale plant in an actual plating facility, the technical and economic feasibility of using RO for the treatment of electroplating waste streams.

Abcor has designed, built, and is currently operating a full scale demonstration plant which uses RO in a closed-loop system to treat copper cyanide rinse water. In the proposed program this demonstration plant will be refurbished as required and operated on three different plating waste streams. These streams will be chosen with the approval of the Environmental Protection Agency and the American Electroplaters Society. The RO treatment of each waste stream will be examined for approximately six months. The membrane flux and rejection will be followed over this period to determine membrane life. Other factors such as membrane fouling and the build-up of bath impurities will be examined. The various costs and savings of the RO process will be carefully followed so that an accurate assessment of the process economics can be made.

R800962 03

The inshore marine environment is an increasingly important area for mankind. The expanding population, with its inherent problems of greater industrialization, greater food needs, and increased recreational needs, has added to the ecological pressures of the inshore environment. How do we protect this environment for the present as well as future generations? Polychaetous annelids are the most numerous form of bottom-dwelling marine life in terms of both species and specimens. They constitute an important role in the movements of sediments much like an earthworm does on land. Polychaetes are important as a food source for fish, carnivorous invertebrates, as well as shore birds. The two primary objectives of this research proposal are:

(1) to study the effects of selected heavy metals (copper, zinc, cadmium, mercury, lead, and chromium), pesticides (DDT and malathion), and petrochemicals on larvae, juveniles, and adults through at least one complete life cycle. Ten species of polychaetes will be used to determine the most sensitive stage as well as any long-term effect on the offspring.

(2) to develop laboratory strains of polychaetes which can be used as test organisms for these bioassays. Comparisons will be made with field collected specimens to ascertain the validity of laboratory bred test organism. A manual will be prepared outlining the procedures to follow for culturing and conducting bioassays for each species.

800971 03

The overall objectives of this project have been to sample and analyze atmospheric aerosols with particular emphasis on aerosol size distributions and aerosol chemistry. To date a large part of the effort has been devoted to the development and construction of a mobile air pollution laboratory and to its use in the RAPS program in St. Louis, Missouri.

Work for the 1974-75 project year includes (1) finishing of stages II and III software for the computerized data acquisition in the EPA mobile laboratory, (2) construction of a compact aerosol analyzer combining an optical and electrical aprticle counter into a single unit for the use in aircraft, and (3) participation in research in St. Louis during the summer of 1974 both on the EPA mobile laboratory and aboard aircraft, and continuation of analysis of field data obtained in California and St. Louis.

Laboratory work that will be supported by this grant includes studies of the size distribution and concentration of combustion aerosols, studies of aerosols produced in a smog chamber, and calibration studies of optical and electrical particle counters.

Important results obtained with the partial support of this grant are further evidence for the ubiquitous occurrence of bimodal mass distributions in the atmosphere, evidence for secondary aerosol formation in a power plant plume at 9000 ft. over St. Louis and in non-urban locations in California.

R 800981-03

Objectives: Determine the environmental requirement and the effects of temperature changes on the tolerance and physiology of crustacean larvae. The specific ones of emphasis during the budget period will be:

1) Optimum conditions for larval development of Rhithropanopeus harrisi and Pagurus longicarpus
2) Determine the effects of cycling temperatures on larval development of Cancer irroratus, Homarus americanus and Palemonetes pugio
3) Determine the metabolic responses of larvae of H. americanus
4) Determine fatty acid patterns of saturation and unsaturation in larvae at different temperatures

Envivonmental requirements, acute temperature and low dissolved oxygen tolerances and metabolic responses of larvae of two sublittoral and one estuarine species have been completed.

## R801060 11

The major objective of this project is to understand the defense mechanisms of animals to pesticidal chemicals. The compounds which are important from the viewpoint of environmental contamination are the primary target of this research project. Efforts will be made to study the biochemical mechanisms by which organophosphate, carbamate and other insecticidal chemicals affect living tissues. Specific projects proposed are (1) to study the glutathione dependent dealkylating and dearylating systems in various animals from a comparative biochemical standpoint (2) to study the role of mixed-function oxidase systems, (3) to study and classify various esterases degrading organophosphate and carbamate esters, and (4) to study various conjugation enzymes in animals.

The overall aim is to study various target systems and defense mechanisms of animals, by biochemically characterizing each factor through isolation purification, differential inhibition and comparison of substrate spectra.

## R801069 03

The ultimate aim of the research is to synthesize chemical data and concepts with hydrodynamic aspects of waste effluent dispersal in order to predict the fate of chemical pollutants in coastal waters. Analytical data for sewage effluents and ocean water will be utilized together with thermodynamic data, kinetic data, and adsorption data in computer models of effluent seawater sediment systems in Southern California (and other environments). The basic computer model (Morel and Morgan, Environmental Science Technology, 6, 58 (1972); Morel, McDuff, and Morgan, in press (1973) ) deals with metals and ligands. It will be extended to treat: adsorption equilibria for metals on various solids; kinetics of physical-chemical rate processes. The metals of greatest interest in the study are Pb, Cd, Zn, Cr, and Cu.

## R801070 14

Research is proposed on three problems of air pollution effects on plants.

1. Effects of one pollutant ($SO_2$, $O_3$, or $NO_2$) on the susceptibility of the plant to HF injury or on the rate of accumulation of F by the plant. These studies will be carried out with three cultivars of alfalfa, three cultivars of sweet corn, and perennial rye grass.

2. Effects of ambient pollutants in the atmosphere of Yonkers, N. Y. on the growth, yield and quality of plants of commercial, ornamental, or ecological value in the New York metropolitan area. This will include studies with alfalfa and potato cultivars exposed to charcoal filtered and unfiltered air.

3. Responses of plants to components of acid rain on vegetation. Studies will include effects on a model plant, the bean, and on eastern white and Scotch pine under both greenhouse and field conditions.

**R801136 05**

The overall objective of this research is to determine the structure and reactivity of adsorbed oxides of sulfur. Several spectroscopic techniques are being used to follow reactions which occur with $SO_2$ on metal oxide surfaces. Results from such a study will be useful in identifying the photochemical and thermal reactions which take place on atmospheric aerosols. The specific goals during the current year were (a) to study the reactivity of $SO_2^-$ for oxidation and reduction reactions on vanadium oxide supported on silica gel, (b) to determine the photoreactions which occur following the adsorption of $SO_2$, $H_2O$, and $O_2$ on magnesium oxide and (c) to determine whether sulfur oxides are present on atmospheric aerosols. The first two of these objectives has been achieved, and the third study is actively in progress.

801174 02

The objective of the proposed program is the quantitative and qualitative characterization of the organic chemical constituents of selected atmospheric, automotive and model aerosols. Quantitative functional-group analyses will be applied to determine concentrations of key organic compound types in aerosol. Qualitative analysis will be directed toward specific identification of principal organic compounds present in the various aerosols. This will be accomplished using techniques including gas chromatography, mass spectrometry, and interferometric infeared spectroscopy.

Model aerosols will be generated from selected individual hydrocarbons under conditions of atmospheric simulation. Reactions studied will include those initiated by $NO_x$ and by $SO_2$.

801188

The purpose of the proposed research is to continue a study on the mass transfer and transformation of biologically significant material in the once-through cooling system of a steam-electric station that is operating on the west shore of western Lake Erie. For purposes of this study, the cooling system includes the sources of cooling water (the Raisin River and Lake Erie) and the plume into the receiving water (Lake Erie). This study will be integrated with a separate comprehensive, six year investigation of the effects of thermal discharge on the receiving water, presently being conducted.

The objectives of this research include measurements of mass transport of entrained phytoplankton, zooplankton and larval fish through the cooling system and the effects on periphyton and larger fish that inhabit the system. Entrained phytoplankton, zooplankton and biologically important elements are being measured from the same replication water samples at seven locations in the cooling system. These stations have been established to measure import and export of materials through four hydrodynamic zones; (1) the intake region, (2) the upper discharge canal, (3) the lower discharge canal and (4) the plume. The mean retention time in each zone and the total volume flow are being measured so that estimates of total material transfer and transformation can be made. Periphyton will be sampled to measure discontinuous effects in the cooling system. The movements of larger fish into and out of the cooling system are measured with float-tagged fish in order to establish the consistency with which the same fish use the area. The study started in 1972 and is to be conducted over a three year period.

R801305-03

Using techniques which have been developed at the Duke University Marine Laboratory for the culture of Crustacea under controlled environmental conditions, studies would be made to determine the relationship between varying concentrations of heavy metals and the length of larval life (from hatching to the post-larval stages), survival of individual larval stages, and the possible occurrence of supernumerary larval stages or morphological abnormalities during development. Initially, we would concentrate our attention on the effects of mercury, including experiments which would be designed to determine those concentrations of mercury which may be lethal to developing crab larvae under optimal conditions, those concentrations which are sublethal under optimum conditions but may produce abnormalities, those concentrations which are sublethal at optimum conditions, but, under "stress" conditions, result in reduced survival or other abnormalities, those sublethal concentrations which have specific effects during discreet stages of larval development, and the effect of sublethal concentrations in relation to cyclic conditions of temperature.

Larval and juvenile stage crabs from the above experiments would be used in biochemical analysis of subcellular effects. This would include experiments to determine the normal complement of proteins in each stage, any alterations of these protein patterns caused by extended exposure of pre-adults to lethal and sublethal levels of mercury, the normal distribution of specific enzymes and how this distribution may be affected by lethal and sublethal levels of mercury, the specific kinetic analysis of enzymes, and the effects of mercury on the properties of the oxygen-binding protein, hemocyanin, from adult crab forms.

Larvae of a number of different species would be considered, taking into consideration the environmental niche of the adults, the levels of sensitivity to the environment and the east of culture.

R 801320

**The coastlines of Washington, British Columbia, Alaska, and Maine are indented by numerous deep, laterally-constricted inlets. Our overall objective in this grant has been to investigate circulation in such inlets, with a view toward eventual prediction of pathways and retention times of pollutants in inlet waters.**

**During the grant continuation period, we shall place high priority on the exploration of different techniques for modeling various processes in stratified inlets. Specifically, we intend to pursue the following tasks:**

**(1) we shall extend our development of time-dependent models of circulation in stratified inlets with bathymetric features to include effects of viscous drag and turbulent exchange between strata;**

**(2) we shall complete a report describing a model of the effect of inlet circulation and various environmental factors on springtime phytoplankton growth in Puget Sound; we also hope to extend our findings in this area to include different seasons by participating in a proposed comprehensive data acquisition program in the Sound (for which alternative funds are sought);**

**(3) we shall complete dye injection studies with the Puget Sound hydraulic model, and prepare a report describing the results of this work and the general surface circulation study performed during the current year; and**

**(4) we shall continue our study of the intrusion and dispersal of oceanic water in deep basins with the retrieval, correction, and plotting of seasonal averages of hydrographic parameters at various depths at key locations throughout Puget Sound, as measured during cruises by the Department of Oceanography in years past.**

S801871 01 2

This application is for an increase in the existing U. S. Environmental Protection Agency grant which increase will allow for a full 3-year program of application of wastewater solids which period has been determined to be necessary in order to conclusively determine whether wastewater solids to be applied on lands without any significant adverse effects on the total environment.

The Authority's engineers and Rutgers University have investigated and believe that recycling the solids to the land would be beneficial from the standpoint of reclaiming barren land by building up the organic content of the soil, supplying much-needed nutrients for vegetated areas, and increasing the moisture-retaining capabilities of leached-out sandy soils.

The purpose of the pilot project is to demonstrate how a high-quality soil and vegetation can be developed by utilizing digested wastewater solids. Physical, chemical and bacteriological testing of the groundwater and vegetation will be performed on a regular basis. Studies will be conducted to determine distribution methods, optimum solids loading rates and the effects of weather and atmospheric conditions.

## R801951 02

The objective of the program of work is to study the effect of micronutrients on community structure and function. The rationale for the investigations is that trace materials may exert selective pressures on species within the community, thereby altering species composition and pathways and efficiency of energy transfer. Nitrilotriacetic acid (NTA) and trace materials from rural watersheds, particularly chlorinated compounds, have been proposed for study. Experimentation is divided into two phases: work with microbial communities (bacteria, fungi, algae in particular) established in microcosms, and work in ecosystem streams which support 80-90 percent of the algal and invertebrate species found in the parent stream. Selected fish populations may be introduced into these streams. Experimentation with NTA has been started with microbial communities. Gas chromatographic procedures permitting detection to 0.010 mg/l have been adapted for routine use. Alteration of algal community structure has been observed at 200 mg/l, a level far exceeding the concentrations of NTA expected in natural habitats (0.02-2.0 mg/l). Mineralization of dissolved organic matter by bacteria and fungi does not seem to be impaired, nor is attachment of microbes to surfaces exposed to NTA affected by environmental levels. Bacteria capable of degrading NTA have been found in the natural bacterial flora. Concentrations of $10^{-3}$M. NTA solubilized metals (Fe, Mn, Cu, Zn) from natural sediments, $10^{-5}$M. solubilized only Zn and $10^{-7}$M. appeared to have no effect. Results are preliminary and must be validated by experimentation at other times of year.

## R801976 03

The objective of the study is to provide base-line field information to assist laboratory researchers concerned with effects of oxygen fluctuations on embryo development and hatching success of selected species of freshwater fishes.

Measurements of dissolved oxygen and water temperature are made in the field adjacent to naturally spawned eggs. Both manual and automated techniques for measuring dissolved oxygen are being tested. In order to determine influence of dissolved oxygen on hatching success field experiments will subject fertilized eggs to various levels of dissolved oxygen for given time periods.

During the first-season of study the manual method was found to be reliable and accurate for measuring dissolved oxygen adjacent to fish embryos of northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), bluegills (*Lepomis macrochirus*) and pumpkinseeds (*Lepomis gibbosus*). Daily fluctuations of dissolved oxygen and water temperatures were measured from time of spawning to time of hatching.

## R802005-06

Metabolites formed by animals and plants exposed to radioactive carbamate insecticides will be identified or characterized according to their general nature such as "free", "conjugated" and "bound". Individual metabolites or groups (for example, bound metabolites) will be generated in quantities sufficient for studying their fate in animals. The metabolites will be administered orally or by injection as single and/or multiple doses. Studies will be conducted to determine if and at what rates the metabolites are degraded, the sites and levels of storage of the metabolites and their degradation products in the body, and the rates and nature of the radiocarbon eliminated in the urine and feces. Metabolites with a potential for high levels of exposure and demonstrate a tendency for storage will be further examined with emphasis on rates of accumulation in the body as related to dosage levels and time of exposure. Attempts will be made to synthesize metabolites containing the carbamic acid ester and the toxicity of these metabolites to rats will be determined. In addition to acute toxicity studies, conjugated carbamate metabolites, when sucessfully synthesized, will be evaluated for their general toxicological effects (growth rates, organ weights, visual symptoms, etc.) on chronically-exposed animals.

## S802008-03

The field experiments will be conducted at the Texas A&M University Agricultural Experiment Research and Extension Center at Beaumont, Texas. Different irrigation management practices and application rates of agricultural chemicals will be tested on field plots: a) to conduct field scale experiments on the nutrient, pesticide & water balance or rice fields with particular emphasis on measurements of deep percolation and released water. b) to sample and analyze the water entering and leaving the fields by the various pathways for persistent and toxic pesticides and nutrients. c) to determine the effect of recommended and excessive application rates of nutrients and pesticides on the pollution hazard from rice production. d) to use the data obtained to develop management practices which will minimize or eliminate the pollution hazard.

1) Field studies of existing management practices will be used to determine the movement of water, nitrate, other salts and pesticides as influenced by irrigation management and chemical application rate on the losses by deep leaching and in the released water. 2) A simulation model of the losses of water and chemicals from the rice field will be developed. The data collected in the field will be used in the development and testing of the model. The model will then be used to suggest and to test alternative management practices. 3) The management practices so developed will then undergo additional field testing and refinement as necessary. The leaks in the levies which caused some lateral movement of water during the first year have been eliminated. The second year was much dryer than the first, resulting in higher residual concentration of pesticides in the irrigation water than were found during the first year. The occurance of rainfall after pesticide applications has been identified as a major factor in determining their concentration in the flood water. The concentration of potentially harmful nutrients in the flood water has been low and has not exceeded drinking water standards. The salt balance of the rice paddies has been monitored and a model ~~is being developed so that changes in concentraton can be simulated and predicted. The~~ field work for the first and second season has been completed.

R802036 03

A process for the high temperature removal of $H_2S$ from low-Btu gas from coal gasification is needed if proposed combined cycle electrical generating plants are to operate at maximum efficiency. Reacting the $H_2S$ with a metal oxide to produce a solid metal sulfide capable of being regenerated shows potential in achieving this goal.

This research is aimed at identifying potential metal oxides which possess the necessary chemical and physical properties to accomplish the task. The following approach is being utilized: (1) Identify candidate metal oxides on the basis of a thermodynamic analysis of desulfurization capability and solid stability. (2) Perform exploratory kinetic screening on selected metal oxides identified in the thermodynamic analysis. (3) Perform detailed single particle kinetic studies on high potential candidates. (4) Examine the time-temperature-conversion stability of selected candidates to determine conditions where the solid will maintain high activity through numerous reaction-regeneration cycles. Objectives (1) and (2) are complete with (3) and (4) underway.

Thermodynamic analysis was based upon a free-energy minimization study of the complex coal gas-solid system. Kinetic data is obtained from thermobalance experiments using synthetic gas mixtures representative of the actual low-Btu gas. Stability studies require measurement of solid properties, such as surface area, to supplement kinetic measurements.

R802082 03

Lake Washington has gone through large changes in its biological condition because of eutrophication with large volumes of secondary sewage effluent and subsequent diversion of the effluent. Changes in the condition of the lake have been studied from the viewpoint of experimental limnology with special reference to the relation of nutrient income to productivity, population density and species present. By 1973 the lake appeared essentially to have recovered from its enrichment. The goal of the work now is to define the present condition of the lake as the endpoint of the fertilization experiment and as a basis for evaluating the effect of possible future changes in the water income of the lake and other changes. Measurements are made repeatedly of conditions related to control of productivity and population density including, among other things, primary production, nutrient concentrations and other relevant chemical features, kind and quantity of plankton.

802087

The purpose of these experiments is to develop and improve techniques for the rapid identification of viruses found in a polluted water system, and to ascertain whether certain tumors found in poilikothermic animals contain viruses. Leukemias and lymphosarcomas found in Esox lucius will be intensively investigated to determine whether chemical carcinogens act as virus excitors to produce the disease. The previous surveillance showed a 377% increase in tumor frequency. Monitoring of the water and fish for human viruses will be continued.

R 802132-03

The transport of heavy metals in aerosols will be investigated in the St. Louis, Missouri area by means of sample collection on filters and in cascade impactors, chemical analysis by sensitive nuclear methods of neutron activation and x-ray fluorescence, and correlation with sample location, particle size distribution time variation during changing meteorological conditions, proximity to major sources, altitude of sampling, and the occurrence of rain and fog. The relative importance of natural terrestrial and marine sources and urban or industrial pollution sources will be compared for each element, as well as the effect of source processes on particle size distribution. The study should lead to improving our prediction capability for the distance of transport of different elements and its dependence on particle size and meteorological factors and a determination of the extent of impact of pollution sources on air quality at distances remote from the sources. Moreover, the data obtained will aid in the setting of air quality standards by better evaluation of natural vs. pollution sources and by documenting the concentrations of trace metals as a function of particle size, information which may be related to aerosol respirability and impact on human health, and which may be linked to the types of processes occurring at pollution sources.

802160 02

Objectives: The goal of this research is to develop experimental and theoretical methods for relating the properties of the pollution aerosol to the characteristics of emission sources.

Approach: This will be accomplished by starting from the observed chemical and physical characteristics of the pollution aerosol and testing certain hypotheses for the atmospheric changes which occur in the size distribution and chemical composition.

Progress and Plans: Chief among the atmospheric changes are the growth processes resulting from gas-to-particle conversion of organic vapors, $SO_2$ and $NO_2$. By laboratory experiments with atmospheric air samples, data are being obtained on particle growth rates as a function of particle size. At the same time gas-to-particle conversion rates are being measured by chemical analysis. It is also proposed to initiate a separate set of studies on the deposition of aerosols in models of the human lung. The goal will be to estimate the rate of deposition of various chemical species present in the pollution aerosol at points of high deposition intensity.

R-802172-02-0

This Study will:

1) Establish the effects of application of sludge on forest growth rate.

2) Establish efficient and effective methods of sludge application to forests.

3) Establish the rate of sludge application which has maximum benefits to forest growth with minimum impact on soil water quality and be non-polluting to surface or ground waters.

4) Establish the short-term impacts of sludge application on the forest, including effects on microbiological organisms and higher plant species, physical and chemical prpperties of the forest and soil and the chemistry of soil water.

The second year of the study will continue with evaluation of the above objectives and place particular emphasis on the retention movement and soil mass balance of certain elements contained in the sludge. Also evaluation of varying rates of sludge application as related to total chemistry and forest growth will be emphasized.

Retention, movement and mass balance of chemicals applied in sludge will be evaluated by resampling the forest soil by depths. In this manner changes in elemental constituents from the pretreatment condition-will be established. Identification of the mechanisms of retention and movement of certain chemical elements is proposed through use of radioisotopes. Radioactive isotopes will be placed in confined soil columns. These columns will be sampled at 6-month intervals to relate penetration of the isotope to type and size of soil particle

R802207

It is the overall objective of this study to investigate the feasibility of using microbiological processes to mitigate the effects of hazardous materials spilled into watercourses. Several specific objectives have been established as follows: (1) investigate the response requirements for any hazardous material spill; (2) determine the minimum response requirements needed using microorganisms as a biological countermeasure for these materials; (3) conduct screening tests to determine candidate microorganisms for mitigating the effects of selected hazardous materials from the Environmental Protection Agency priority-ranked list of soluble hazardous polluting substances; (4) conduct model ecological system studies (simulating lotic and lentic environments) to assess total system response to hazardous materials and their decomposition products; (5) select microorganisms which mitigate the effects of the selected hazardous materials and conduct simulated spill experiments on the model ecosystems employong these organisms to assess their mitigation efficiency; (6) develop production, storage, reculture, and deployment methods for bacteria selected; and (7) evaluate the practical feasibility of using microorganism countermeasures for mitigating the effects of hazardous material spills.

The work includes literature surveys and experimental work in biological treatment units and in aquatic microcosms to determine the biodegradability and fate of hazardous materials and tests on simulated spills of these hazardous materials in contained aquatic ecological systems. The materials being tested include acetone cyanchydrin, acrylonitrile, aldrin, benzene, cyclic rodenticides and insecticides, DDT, isoprene, methyl alcohol, nitrophenol, nony phenol, phenol, styrene, xylene, and toxaphene.

### R802233 03

The objectives of this research project are to obtain information on lung growth as monitored by pulmonary function testing in a longitudinal population of young children. This study is being performed in an area of low environmental air pollution and the influence of natural acute respiratory infections with viruses, bacteria and mycoplasmas on the children's pulmonary status is being monitored. Efforts to seek better methods for measuring pulmonary function in young children and to examine the development of immune respiratory defense mechanisms are goals of this study. Thus, the role of both infection and immunity which may modify host response is being evaluated relative to the child's lung growth in an area of low air pollution.

### R802288 03

(1) Objectives

There are three main objectives of this work. First, the measurement of rate constants involving alkoxy radicals; second, the characterization of the mechanism of ozonolysis; and third, to provide a critical overview of rate data for modeling purposes.

(2) The approach to the first two objectives is experimental, making use of the VLPP technique; the third objective is approached by critical analysis within the framework of transition state theory.

(3) Current plans are to continue pursuit of methoxy radicals and to confirm our findings on the high rate of reaction of alkoxy radicals with NO and $NO_2$.

We will also attempt to isolate the expected intermediate in ozonolysis, the Criegee Zwitterion (or biradical).

Evaluation of rate data is an ongoing project.

### S-802292-01

The primary objective of this project is to disinfect parallel streams of effluent from a secondary activated sludge wastewater treatment plant with chlorine and ozone. Part of the chlorinated effluent stream will be dechlorinated with sulfur dioxide. The chlorinated, dechlorinated, and ozonated streams, and a control stream of the same effluent, would be compared for their toxic effect on several species of fish and macroinvertebrates. Disinfectant dosage will be controlled at levels sufficient to yield effluents having a total coliform count not to exceed 1,000 per 100 ml, but use of gross excesses of disinfectant beyond the amount necessary to yield the desired reduction in coliform content will be avoided. Results obtained will provide a basis for determining which system of treatment will combine the desired level of disinfection with the lowest toxic effect on the biological forms used in the tests.

The same work will be carried out at a trickling filter plant that has industrial effluents equal to more than half its load.

The project will commence after both plants have begun removing phosphates in compliance with the Lake Michigan Enforcement Conference orders.

A fifth stream of final effluent disinfected with Bromine-chloride may be added at both plants.

802309

1. The primary objective of this project is to restore Shagawa Lake bordering the City of Ely, Minnesota from a highly eutrophic condition to a healthy state.

2. To accomplish the above objective, it was determined to be necessary to substantially upgrade the quality of and to remove essentially all phosphorus from the City of Ely's high-rate trickling filter plant effluent. This effluent constitutes virtually a point source of phosphorus discharge into the lake. A 1.5 mgd tertiary treatment plant has been constructed to further treat the trickling filter effluent. Tertiary facilities consist of flow equilization, two-stage lime clarification, dual-media filtration, and chlorination. Lime sludge is mixed with digested sludge from the trickling filter plant and disposed of via gravity thickening, vacuum filtration, and trucking to sanitary landfill. The concentration of phosphorus being sought in the tertiary effluent is 0.05 mg/l as P, or less.

3. In April 1973, three years of carefully-controlled operation (using EPA and City personnel) was started, during which time, it is hoped the restoration of Shagawa Lake can be demonstrated. After 18 months of operation, it has been shown that the residual phosphorus objective of 0.05 mg/l as P can be routinely achieved.

R802336 02

A three year study will be conducted to research and demonstrate the feasibility of replacing the aerobic cell in an anaerobic-aerobic two-cell system, with overland spray systems for animal waste disposal. This study will determine the influence of spray intervals on receiving capacity of the overland spray area as related to various volumes of waste water usage, extent of waste water improvement using appropriate measures of quality, response of model crop plants to animal waste water, and the extent of nitrate, total nitrogen, copper and phosphate build-up in the run-off soil perifery.

A cost analysis will be made comparing the anaerobic-aerobic installation, maintenance and utility, with the overland spray system. Appropriate analysis of variance will be used to test the water and soil quality variables of the experiment. Results will be published for EPA oficial use and for distribution through the Cooperative Extension Service and MAFES - Alcorn State University Branch.

## R802350 03

We have been analyzing a wide spectrum of marine organisms for their heavy metal content by atomic absorption spectrophotometry. Our most significant findings are:
(1) Normally born sea lion pups and their mothers have very high hepatic mercury concentrations: howdver, the mercury is balanced by equal molar concentrations of selenium. In contrast, aborted pups have relatively low hepatic Hg concentrations and excess amounts of Se.
(2) We continued to find high Cd levels in sea otters, Enhydra lutris (up to 964 ug Cd/g dry kidney.
(3) We collected 40 plankton samples off Southern and Baja California and observed markedly higher concentrations (up to 21 ug Cd/g dry weight) in the plankton off Mexico
(4) We found very high copper concentrations (up to 15,000 ug/g dry weight) in the liver of the common California squid, Loligo opalescens, in conjunction with elevated Ag and Cd levels.

## R802373 02

We are continuing work on the use of permeation tubes for NO and CO Standards. These tubes should permit the direct gravimetric calibrations of these gases. The permeation of nitromethane followed by pyrolysis has been developed as a suitable method for NO Standards. Construction of a nitrosopropane permeation tube will be attempted along with pyrolysis. This should require a lower pyrolysis. This should require a lower pyrolysis temperature than nitromethane. A $Ni(CO)_4$ permeation tube is under study for use as a CO standard. Rates of weight loss and permeation products are under study.

## R802394-01

**Objectives:** To survey existing analytical methods for particulate measurement; to identify and catalog the chemical and physical properties of asbestos fiber; to establish criteria for its measurement; and to evaluate and/or develop techniques for quantitative measurement of asbestos fiber for the purpose of establishing a standard procedure for asbestos analysis in air samples for process control purposes.

**Approach:** Survey existing literature relating to particulate measurement and to the properties of asbestos fibers. Evaluate existing analytical techniques as they apply to asbestos fiber measurement. Carry out experimental research leading to the improvement of existing techniques and/or the development of new techniques with improved capabilities for quantitative asbestos fiber measurement.

**Progress:** The periodic literature has been reviewed so as to identify those experiences and references relating to the quantitative and qualitative measurement of asbestos fibers. A catalog of the existing knowledge of the physical and chemical properties of asbestos has been assembled for the purpose of identifying unique or novel means of detecting or sensing asbestos fibers. An evaluation of new and existing analytical techniques has been made and ranked relative to their intrinsic capability for identification and quantitative count measurement of asbestos fibers. Two such techniques have been identified as having the potential for satisfying the objectives of this grant.

**Current Plans:** An experimental development program is now defined that will provide experimental evaluation of asbestos fiber counting by using either scanning electron microscopy with image analyses, or light scattering techniques using a laser as the primary light source.

R802411

The Storm Water Management Model (SWMM) has proven itself to be a useful computer simulation tool for studies of pollution caused by storm and combined sewer overflows. However, documentation of model usage lacks a clear, concise, logical sequence for users to follow. An extensive effort will be made to revise the present User's Manual to correct for this defect and others and to completely update the model. In addition, refinements will be added to flow routing procedures to account better for backwater, interconnections and surcharging. Treatment and solids handling alternatives other than those presently considered in the SWMM will be examined for application to pollution control. Finally, planning guidelines will be prepared for use by those charged with obtaining least cost, yet environmentally sound solutions to urban drainage and pollution problems. These guidelines will include the results of all available research.

R802412 02

The project is to evaluate the vegetative covers and factors relating to the soil cover material of sanitary landfills. The objectives of the study are: (1) to determine what type of soil to be used as the final cover material, how it can be manipulated at the surface of a sanitary landfill to minimize water entry into the buried refuse; (2) to determine what types of vegetative cover material (grasses) to be used at a sanitary landfill site in minimizing water permeability, in controlling erosion, and in determining the final use of the site; (3) to determine the total relationships of the soils, the vegetative cover material, and the buried refuse in various stages of decomposition in order to come up with recommendations for the effective use of sanitary landfills.

Studies are being conducted both on the simulated sanitary landfills as well as under field conditions. Three species of grasses established in three different types of soil (loamy sand, sandy loam, and clay) used as cover material which have been compacted to give three different bulk densities, constitute twenty seven treatment combinations.

Relationships of various parameters such as infiltration, gas production, growth pattern of grasses, temperature, and subsidence, etc., are to be evaluated as a function of time, bulk density of soil, type of soil, and species of grasses grown.

## R802440 03

The aims of this project have been changed from those indicated in the title to a study of cadmium uptake localization in Neomysis americana with particular emphasis on the use of an electron probe for the most precise localization.

Organisms exposed to cadmium concentrations ranging from 2 ppm to 50 ppb for periods ranging from 24 to 96 hours will be fixed in glutaraldehyde and osmium, embedded in paraffin and thick sectioned for electron probe analysis of cadmium content of different tissues. Sections from all regions of the body will be studied in this way in order to localize cadmium deposition sites most precisely.

Tissue localization will be followed by cellular and intracellular localization using the same kinds of techniques. Ultimately it is hoped to correlate transmission E.M. studies of the particular cells most affected and to determine thereby the nature of the interaction between cell organelles and cadmium.

At the same time cadmium tolerance limits studies will be continued as will studies on laboratory maintenance and culture of Neomysis americana. Successful culture should enable us to obtain sufficient numbers of all life history stages to be used in further electron probe studies.

## R802455 03

This investigation is defining the influence of turbidity on fish abundance in western Lake Superior through measurement of effects on species composition, distribution, mortality, growth and feeding relationships. During the first two years, field samples were collected from four stations from May through October by seine, bottom trawl and mid-water trawl at depths from 0.5 to 25 m. Influence of turbidity and temperature are being assessed by measurement of effects on fish population dynamics. Supporting laboratory studies are aimed at defining turbidity preference and influence on feeding in walleye, Stizostedion vitreum vitreum (Mitchill), lake trout Salvelinus nemaycush (Walbaum) and smelt Osmerus mordax (Mitchill).

Preliminary analysis of data suggests:

1. Turbidity results in movement of smelt off the bottom and increase of larval fish in the diet. These changes suggest that turbidity is indirectly responsible for decline in herring abundance in western Lake Superior.

2. Temperature limits walleye to shallow water and causes size segregation in smelt. Both result in increased survival and abundance of smelt.

3. Turbidity results in replacement of salmonids by walleye at the top carnivore position in the food chain.

802464

The study of Cladophora has been inhibited because of the extreme difficulty in culturing this alga under laboratory conditions. It is essential that we know the nutritional requirements of this nuisance plant if we are to have a sensible phosphorus removal program. Dr. Fitzgerald and Dr. Gerloff are experienced in the growth of various aquatic plants and have done extensive work with Cladophora.

R802472 02

The purpose of this program is to develop chemical, physical, and mathematical models of atmospheric aerosol formation and growth. This program utilitizes a large chamber located outdoors exposed to ambient conditions. Experiments are conducted by injecting pollutant gases into the chamber at controlled levels and then data are collected as the gases react and submircon aerosol is formed. The variables which can be manipulated are concentration, and chemical composition of the gas phase, water vapor, the concentration, size distribution and composition of pre-existing nuclei in the system. Systems to be investigated include those which produce single condensed phase products such as:

$$SO_2 + O_2 + H_2O \xrightarrow{h\nu} H_2SO_4$$

$$SO_2 + O_2 + H_2O + NH_3 \rightarrow (NH_4)_2\ SO_4$$

$$NH_3 + O_3 \rightarrow NH_4NO_3$$

Physical processes studied include nucleation of the reaction products and growth by condensation and coagulation.

The chamber has been completed and experiments have been done to characterize the behavior of the system.

R802543

The Ohio State University proposes to continue present research on Lake Erie to determine the effectiveness of Federal, State and local nutrient control programs in reducing the over-enrichment of this important body of water. The prime objectives of this research will be the development of a system of indicators which will index the state of eutrophication in the lake as a function of time. This objective will be approached through a series of repetitive field surveys in the western and central basins of Lake Erie to monitor various trophic levels in the ecosystem of the lake and to analyze several physiocochemical properties of the water and the sediment.

802565

A study to obtain experimental evidence that defines and explains the ability of biological surfaces, specifically soil, to scavenge air pollutant gases from the atmosphere. The aim of the first phase of the project is to determine through systematic laboratory experiments the quantitative removal rate for light hydrocarbons and other selected air pollutant gases by different candidate soil ecosystem types. In addition, the development of ATP measurements for indexing the flux in the microbial biomass in the soil will be further investigated. The second year's objective extends the research into an area of more sophosticated interest as it regards determining the threshold concentrations at which biological and/or biochemical effects can be measured. The overall goal of the project is to determine the microbial biomass response to air pollutant gases at levels equal to or greater than the National Ambient Air Quality Standard. These data are needed in order to design an appropriate field monitoring package for determining biological effects of air pollutant gases for aiding in the compliance with ambient air standards.

R802570 02

The National Council on Radiation Protection and Measurements (NCRP) seeks to collect, analyze, develop and disseminate information and recommendations on radiation protection and measurements and to foster cooperation among organizations concerned with radiation protection and measurement. After identification of an area in which NCRP recommendations would be useful, the Council initiates research aimed at:

1. Assessment of the available information which is pertinent to the problem.
2. Identification of areas where more information is needed.
3. Synthesis of present knowledge relevant to the problem area into practical recommendations on radiation protection and measurement which also highlight areas in need of further study.

This project is concerned with the following topics (1)radiation hazards resulting from the release of radionuclides into the environment (with particular attention directed to the examination of the problems connected with the release of iodine-129),(2)environmental radiation measurements,(3)tritium measurement techniques for laboratory and environmental use and (4)quantities,units,measurement techniques,biological effects and exposure criteria for radiofrequency electromagnetic radiation.

Initial work on NCRP studies are carried out by scientific committees. If preliminary study by a scientific committee justifies it, work is begun on the formulation of draft recommendations. This involves a detailed examination of pertinent information already available,identification of areas in which information is meager or unavailable, and an assessment of the scientific thinking on the problem at hand. The final result of the scientific committee's work is usually a draft of a proposed NCRP report. This draft is submitted to the members of the Council for review,modified on the basis of Council Member comments and finally, after membership approval, published.

R802656 02

Our primary objective is to provide baseline data on the levels of eight metals (Ag, Cd, Co, Cu, Fe, Ni, Pb and Zn) in commercially important marine biota from four Maine sites. The study areas are: one, Muscongus Bay (low background levels of metals); two, St. George River (mineralized, mined); three, Blue Hill (presently mined for Cu/Zn); and four, Cape Rosier (recently active metal mine). Thus, we seek to compare metal levels in different marine plants and animals from high and from low metal background areas, and also from high background areas which are mined, recently mined and unmined.

Basically, sampling will be conducted in the spring and the fall. Samples will include filter feeders, deposit feeders, carnivores, omnivores, and plants. Sediments and water samples will also be collected. Water samples will be acid-fixed in polyethylene bottles. Other samples will be freeze-stored in double plastic bags.

Generally total animal or plant analysis will be conducted. Sediments and biological samples will be wet ashed ($HNO_3$) prior to atomic absorption analysis for total metal levels.

R802659 03

(1) Objectives: (a) Make field collections of from 50,000 to 100,000 pecan weevils; (b) Laboratory bioassays will be made utilizing olfactometers to demonstrate the activity of specific volatile compounds; (c) measure the responses of antennal chemoreceptors to pheromone isolates using electrophysiological methods; (d) the volatile compounds showing activity in the laboratory will be specially formulated for evaluating in the field (adult infested pecan orchards); (e) continue chemical and biological assay procedures to isolate and identify the active volatile sex attractants.
(2) Approach: (a) Nylon cloth netting and cone-Leggett traps will be used to trap large numbers of adult weevils as they emerge from the soil during August and September; (b) olfactory responses by adult pecan weevils to chemical fractions will be measured in specially constructed olfactometers; (c) the responses of antennal chemoreceptors to candidate chemical fractions will be monitored using electrophysiological equipment; (d) the field bioassay studies will consist of evaluating number and sex of adult weevils captured in traps baited with volatile compounds extracted from male and from female adult weevils; (e) establish class or classes of contributing compounds by chromatographic processes. Study functional groups by chemical alteration. Isolate and identify pure component(s) from previous fractions by an integrated gas liquid chromatography-mass spectrometry and other spectroscopic techniques.
(3) Current Plans: All of the procedures outlined in (2) above will be attempted in the new (1975-76) period. An additional study will be made to elicit olfactory responses in olfactometers and in field bioassay studies to possible active compounds obtained from gastro-intestinal excretions. A scanning electron microscope study to identify the sensilla trichodia receptors on the antenna of the pecan weevil will be completed during the next project period. The evaluation of different combinations of grandlure components will be attempted in laboratory and field bioassay trials. A joint USDA/State (Miss. & Ga.) cooperative effort will be undertaken in an effort to expedite certain objectives of this project.

R802685 03

A detailed survey of physical, chemical and biological factors in Saginaw Bay, Michigan (western Lake Huron) will continue until November 1975, as part of the U.S.-Canadian Upper Lakes Reference Study. Goals of the study, to be completed in 1976, are to define water quality conditions in the bay, to develop mathematical models of nutrient flux and algal productivity, and to predict the effects of variations in nutrient loadings. Statistical analyses of the data also will be used in correlating water quality variables.

Parameters monitored at 59 stations (in 1974) and 37 stations (in 1975) include: dissolved oxygen, pH, alkalinity, temperature, conductivity, water transmittance, reflectance and clarity, suspended solids, chlorophylls, organic carbon, nitrogen and phosphorus, nitrate-nitrite, orthophosphate, ammonia, sulfate, silica and metallic ions. Sampling at surface and depth is conducted at 18-day intervals coincident with ERTS (satellite) monitoring of the bay. Additional continuous or daily sampling will be conducted at selected stations. Cooperative studies of plankton populations and current patterns are in progress.

The resulting data base and models will be useful in formulating policies for pollution abatement in Saginaw Bay and adjoining waters.

R-802706-02

Objectives: a) Collect and analyze water and sediment samples as well a phytoplankton, zooplankton and benthos in order to ascertain the eutrophic status and to establish an ecological baseline for the Eastern Basin.

b) Evaluate the nature and extent of problems associated with over-enrichment as well as the effectiveness of pollution abatement programs on a large lake.

Approach: a) Twenty-five (25) stations in the Eastern Basin of Lake Erie will be visited during each of 15 cruises between 1 July 1974 and 30 June, 1975.

b) Chemical and biological analyses will be made according to the procedures used in the IFYGL program.

c) A model for oxygen depletion in the hypolimnion will be constructed using the procedures developed by Burns of the Canada Centre for Inland Waters.

Progress: a) Twenty-five (25) stations in the Eastern Basin were visited on twelve (12) occasions during 1973. Progress Report available upon request from the Principle Investigator.

R802709

The objective of the study is to provide basic information upon which a more scientific evaluation may be made regarding the health hazard potential of stormwater in the urban setting. It is proposed to determine the presence and concentration of selected pathogenic organisms including other than enteric forms. The relationship of these pathogens to the customary microbiological indication of sanitary water quality will be established. The results should suggest the type and degree of storm water treatment necessary for the protection of health. Routine sampling will be made of sewage at the wastewater treatment plant for reference and waters flowing in the urban streams to obtain background information. Sampling stations for stormwater will be set up at six sites ranging from relatively clean residential areas. One of the sampling stations will be a combined sewer system.

The study will, of necessity, include evaluation of sampling equipment and methods and cultured materials. The project is expected to be completed in two years.

R802724 02

The principle objectives of the research will be the development of relatively simple, reliable, analytical methods for routine use in the average analytical laboratory to:

a) Quantify petroleum contamination at the 1 ppm (wet weight) level in marine organisms and aquatic sediments;

b) Correlate petroleum contamination of marine organisms and aquatic sediments with sources of contamination - "passive tagging".

The state of the art will be evaluated to provide a realistic assessment of the limitations of the various analytical methods vis à vis various petroleum contamination problems.

The selectivity and sensitivity of analytical chemical methods such as column chromatography, thin layer chromatography, gas chromatography and UV-fluorescence analysis will be evaluated.

S-802732-03

The new surface mining method called "longwall stripping" is a technique that could have applications in the State of West Virginia and other mining areas of the country. This mining method employs underground mining technology, called longwall mining, in areas that are often surface strip mined or auger mined. By utilizing a continuously advancing 250 ft. "face" that runs perpendicular to the coal outcrop the coal can be removed without leaving the coal "ribs" left by augers and without overturning the entire earth surface as when strip mined. This is particularly advantageous in very steep slope mining conditions. Additionally, while not a part of this demonstration project, it is possible that this mining could be accomplished without men at the "face" if technology similar to that available in Europe is further developed for U. S. conditions.

In demonstrating this new technology, "longwall stripping", the Association would expect to prove that surface coal mining can effectively and efficiently be balanced with a "clean environment."

802736

Quantitative studies will be conducted to develop and improve methods to measure the survival and distribution of enteric viruses in (a) "tertiary"-treated and reclaimed wastewaters, (b) estuarine and marine waters, and (c) leachates from municipal solid waste landfills. Improved virus detection methods developed in this laboratory will be used in these studies. These methods include: (a) improved field methods for detecting small quantities of virus in large volumes of relatively clean waters, (b) improved methods for detecting viruses in sewage and polluted natural waters and (c) new methods for efficiently detecting enteric viruses in landfill leachates.

R802780-02

This proposed project continuation is part of a coordinated program to assess the effects of eutrophication on biological processes in Saginaw Bay and the impact of conditions and processes in the bay on water quality in Lake Huron. Primary emphasis in this project is on analysis of biological population components of the system. Field work and planning is integrated with other projects concentrating on water chemistry, productivity, and satellite measurements.

Work undertaken on the project to date includes an assessment of benthos distribution and abundance, extensive collections of phytoplankton and zooplankton, and preliminary analysis of these samples.

Proposed work involves completion of the field sampling program and further analysis of samples and reduction of data.

Preliminary results of the project indicate that benthos abundance in the area investigated is considerably (in some cases up to a factor of 10) higher than previously reported. The phytoplankton assemblage of lower Saginaw Bay is strikingly dissimilar from Lake Huron and is dominated by populations tolerant of extreme eutrophication and conservative element contamination. The transport of these populations into Lake Huron appears to be highly species specific, with some populations being lost from the assemblage quickly and others, especially certain species of blue-green algae, showing distribution patterns strikingly similar to conservative chemical ion species.

## R802839 02

An area of great concern in environmentally related research is the consideration of multifactorial determinants of human lung cancer. Animal models for induction of pulmonary neoplasia have employed both intratracheal instillations and inhalational exposure to a variety of organic or inorganic agents, alone or in combinations. Exposures to combinations of agents have been productive of large amounts of important data, but have in addition raised vital questions relevant to many environmental contaminants. Data already available from animal exposures have been useful in postulating pathogenic mechanisms as well as in elucidating specific human health hazards.

Presently, policy making and regulatory agencies are confronted with need for data relevant to the potential health effects of exposure to airborne particulate sulfates. The proposed research will evaluate the role of these airborne particulates on the development of pulmonary neoplasia following exposure of Syrian Golden Hamsters to the ubiquitous hydrocarbon carcinogen, benzo(a)pyrene. This investigation will combine exposure to aerosols of particulate sulfate with an intratracheally administered suspension of benzo(a)pyrene. The end point to be evaluated following the period of daily aerosol and weekly intratracheal exposures will be the frequency of development and morphologic characterization of respiratory tract neoplasms in animals maintained for their natural life-time. The studies include use of radiolabeled airborne particles to evaluate the deposition and clearance of sulfate in the animal respiratory tract, and studies to evaluate pulmonary defense mechanisms operative in this model system.

## R802849-02

The principal objective of this research is the development of solid reagents for the chemical absorption of sulfur dioxide from the atmosphere and its preservation for subsequent analysis. The reagents to be studied will consist principally of certain organic amines supported on, or chemically bonded to, porous glass beads, which will absorb sulfur dioxide in trace concentrations quantitatively, and release it on heating for analysis by appropriate instrumental or chemical methods of analysis. Other compounds, such as certain triphenylmethane dye cations which have been found to absorb dioxide reversibly, will also be studied as absorbents.

## R802913 02

The nuclear technique of proton scattering will be developed into a broad range quantitative analysis method for air particulate matter for all elements up to potassium. Data acquisition and data evaluation times as short as 5 minutes are an objective. Proton scattering spectra and cross sections have been determined using 16 MeV protons from a Tandem Van de Graaff accelerator. A computer program is being developed to utilize it to quantitatively analyze the elemental content of air particulate samples.

## R802914 02

Objectives of the proposed work in continuation of the grant are to determine the acute and chronic toxic levels of cyanide to six species of fish and to invertebrates. The work will be accomplished by flow-through bioassays covering all life history stages from egg to reproducing adults. To date 163 acute tests have been made on six fish species and one invertebrate. Parameters tested have been temperature, oxygen, life history stage, and pH with different concentrations of cyanide. Projected work includes completion of acute tests on a wide temperature range and initiation of chronic tests on four fish species. The effect of temperature and seasonal acclimatization will be determined.

## R802925-02

The objective of the proposed work is to study the role of fuel drop size and drop size distribution within a gas turbine type combustor. An experimental and theoretical program will be developed in concert, paying particular attention to the production and spatial distribution of pollutant species within the combustor. A fuel cloud of known drop size and drop size distribution will be produced within the combustor under known conditions of pressure, inlet temperature, and mass flow. The radial combustion species of $O_2$, $NO_x$, CO, $CO_2$ and unburned hydrocarbons (UHC) will then be measured with gas sampling techniques. To achieve these goals, an experimental combustor test facility has been designed, developed, and instrumented. The heart of the system is a drop generator which prepares the primary zone fuel-air distribution under combustor operating conditions typical of those encountered in current automotive gas turbine engines.

R - 802940-01

(1) To evaluate environmental problems and costs associated with recycle of liquid livestock manure on agricultural land through subsurface injection.

(2) A subsurface injector currently being utilized for municipal sewage sludge will be adapted for use with liquid manure. Manure will be injected at various rates on test plots. The effect of the manure on groundwater, run-off the soil, and various crops will be determined.

## R802955 02

**Objectives of this project:**

The major objectives of this project are:

a. To evaluate the passage and accumulation of pollutants in domestic septic tank disposal fields by use of field studies. The major pollutants to be investigated are total and organic carbon, ammonia, nitrate, nitrate and organic nitrogen, phosphates, salts, and fecal bacteria.

b. To provide a series of test plots available to EPA's National Ground Water Research Program at Ada, Oklahoma, for the study of movement and degradation of organic compounds in subsurface water emanating from spetic systems.

Lysimeters have been constructed with three different types of undisturbed soils. The lysimeters are six feet deep and have been equipped with drainage fields for septic tank effluent. The three soils represented in this study are a fine sand, a loam, and a clay. Each soil will be investigated for high and low watertable conditions with three replications of each soil and watertable condition.

Two septic tank disposal fields representing two different soil conditions have been prepared.

All analytical techniques have been tested and calibrated. Initial analysis of the effluent has been completed. Applications to the lysimeters are beginning.

## R802959 02

The persistence and toxicity of pesticides and their decomposition products represent a serious environmental problem.. The action of sunlight through pesticidal photodecomposition is both an aid and a detriment to the problem in that pesticides are photodegraded to chemicals of greater or lower persistency and to greater or lower toxicity. Currently considerable effort is being directed toward understanding the nature of the photochemical processes of pesticides, the relative role that photochemistry plays in the fate of the pesticides and to some extent, to evaluate these processes under conditions which are environmentally realistic. The proposed work involves a thorough study of the various ways which surfactants (applied simultaneously in pesticidal formulations) alter the photochemical pathways and rates in aqueous solutions and on soil surfaces. Studies of such surfactants on the photochemistry of similar organic molecules show that profound changes in rates of photodecomposition can be effected by the surfactants.

## R802964 02

The objectives of the proposed research include isolation and identification of organic compounds present in textile plant effluents. Samples from cooperating textile mills will be extracted and the extracts analyzed by gas chromatography and mass spectrometry. Several volatile compounds have been identified. Work is beginning on the non-volatiles.

### S802973

(1) Objective: It is the objective of this project to demonstrate the technical feasibility of the application of hyperfiltration technology to the renovation of textile industrial wastewaters. The technical feasibility and economic potential for direct reuse of both the purified product and the concentrated residue will be evaluated. Engineering date necessary for scale-up system design-will be obtained.

(2) Approach: A mobile hyperfiltration laboratory, developed at the Oak Ridge National Laboratory on-site tests with sewage effluent, will be used in this program. Samples of effluents from 14 selected mills will be processed, at Clemson University. Seven (7) industrial plants will then be selected for site visits by the mobile facility. The on-site testing will facilitate the direct involvement of industrialists in the evaluation of the direct recycle of the renovated wastewater.

(3) Plans: The screening tests will be carried out during the summer and Fall of 1974. On-site testing will begin in the winter, with completion during the summer of 1975.

## R802974 02

The objectives of this project are: 1. To elucidate factors affecting movement of nitrogen and phosphorus in a watershed in the Great Lakes Basin; 2. To collect analytical data together with prior hydrologic and climatic data which will allow for evaluation by systems analysis of movement of nitrogen and phosphorus from soils; and 3. To cooperate with members of the Southeast Environmental Quality Laboratory to develop data for systems analysis of nitrogen and phosphorus loss from soils. Fertilizer applications of nitrogen, phosphorus and potassium (KCl) are applied to each of two watersheds and incorporated into the surface 7.5 cm of soil. Sampling of the different areas of the watershed and analysis of the samples establishes an initial mass balance for each element. During each rainfall event that produces runoff, both water and sediment loss are measured and the content of each assayed for nitrogen, phosphorus and chloride. Soil samples are again collected and analyzed to determine the new balance of nutrients within the watershed. This data is used to develop, calibrate and verify systems models of nutrient loss from watersheds.

The primary objective of this proposed demonstration project is to show the advantages of implementing a "package" of technological improvements within the lateral subsystems in reducing the salt load entering the Colorado River. Although major emphasis is upon on-farm improvements, considerable improvements in the water delivery conveyances are also required, as well as some improvements in lowering high water tables (Drainage).

This project will utilize each of the salinity control measures developed in Grand Valley, as well as the addition of various irrigation methods to demonstrate the complete package of salinity control measured for two laterals under each of five canals. No single measure will adequately alleviate the salt load from an irrigated area. Demonstrating the complete package of salinity control measures will not only be a "first," but additional salt load reductions can be expected beyond the sum of each individual measure because of improvements in the operation and management of each lateral. The lateral subsystem begins at the canal turnout and includes all of the water conveyance channels below the turnout and the farm lands served by the lateral water supply.

R803005 01

To establish a method of controlling industrial wastewater entering the Buffalo Sewerage System and to formulate a method for assessing charges. Guidelines for pretreatment of industrial wastes and the operation of a wastewater control section within the BSA will be outlined. Specifically included are the following:

1) Conduct a survey of industrial and large commerical establishments.

2) Monitor the existing BSA primary plant to evaluate loadings, toxic materials and inhibiting pollutants.

3) Determine to what extent significant industrial discharges affect the system, and identify gaps in industrial pretreatment technology.

4) Compare existing treatment and control requirements with new regulations.

5) Identify changes required in municipal and/or industrial sector to meet new regulations.

6) Assess best alternative to effect changes required to meet new standards including technical and economic considerations.

7) Formulate a method of assessing industry in connection with TITLE II of the Federal Water Pollution Control Act.

R803007 02

This is a continuation of a project initiated in 1974 whose objectives are as follows: (a) to determine to what extent new chlorinated organic compounds are formed during the chlorination of municipal wastewaters; (b) to develop a reliable method for the determination of total organic-bound chlorine (TOCl) in a wastewater of water sample; (c) to determine to what extent special types of compounds such as amino acids are subject to chlorination in aqueous systems; and (d) to determine the molecular weight distribution of TOCl values in chlorinated wastewaters. The approach for (a) will be to utilize Rohm and Haas XAD-2 resins for the isolation of new chlorinated organics and MS/GC for the identification of same. The TOCl method will utilize a modification of the activated carbon absorption method for determination of total organics. Work in the past grant period has centered on parts (a) and (b); several new compounds formed during the chlorination of municipal wastes have been found.

### R803018 02

A significant contribution to current air quality sampling technology would be the development of a simple air sampling system capable of determining particulate loading along with size distribution over a broad range of particle size. It is proposed to conduct a research effort aimed at developong a two stage particle fractionator employing series filters which are selctive with respect to particle size.

The Nuclepore surface appears to be a logical choice for such a filter. The simple geometry is readily modeled as a bundle of parallel circular capillary tubes which greatly facilitates the development of a theory for filteration characteristics.

Work is near completion on a first principles model of the inertial impaction characteristics of a large pore (12μm) Nuclepore surface. Preliminary experimental data support the validity of the model and it is expected to have a validated model for filtration efficiency along with theoretical performance curves by mid 1975.

With these performance curves as a guide it is planned to begin an experimental study to explore the feasibility of using series Nuclepore surfaces as a particle fractionator for air borne aerosols in the environment.

### R803020 02

The objective is to identify and evaluate electrostatic effects in fabric filtration. To do this, possible effects are analyzed and each effect studied separately. Then the overall results are evaluated by tests of a bag filter in which the various parameters can be controlled. Electrostatic effects are divided into 2 main categories. Effects in the deposit of dust on the filter surface, and effects between the fibers of the fabric.

When the particles are charged and if there is an electric field at the filter surface a large reduction in pressure drop through the deposited dust has been demonstrated. If the particles carry like charges this porous deposit of dust may be produced by the space charge of the dust.

Preliminary tests indicate that there may be large effects between fibers due to contact potentials between adjacent fibers of the fabric.

R803030 02

In summary, the objectives of this project are: (1) To formulate, construct, test, verify and apply a large scale numerical model of eutrophication in southern Lake Huron; (2) To utilize the results of anticipated in situ experiments in Lake Huron to obtain kinetic parameters which are independent of the verification data; (3) To formulate, construct, test, verify and apply a numerical model of the central basin of Lake Erie with specific attention to the vertical structure and the anoxic hypolimnion; (4) To formulate and evaluate simplified analytical, as opposed to numerical, models of water quality in lakes as a means of providing insight into the behavior of specific components used in the numerical models, as well as to produce formula which can, in some cases, provide first approximations for preliminary engineering analyses; and (5) To investigate a modeling framework which incorporates simplified versions of the above models and the presently ongoing IFYGL - Lake Ontario model development into a three Lake eutrophication model, the purpose of which is to investigate interlake interactions at long time scales.

## R803036 02

The project objectives are to establish if a hypersensitive state (immediate and delayed) can be induced in experimental animals exposed to PtS04 and PdS04 under various experimental conditions. Also, the dose-response relationship will be studied.

Rabbits, guinea pigs and mice are exposed to PtS04 and PdS04 (various concentrations) via various routes (i.e., i.v.. i.d., s.c., i.p., and skin exposure). The skin test is used to detect the allergic state in rabbits and guinea pigs. The footpad test is used in the mouse. Platinum and palladium concentrations in blood and urine per volume are determined throughout the experiment for each animal. Metal concentrations per mass in the spleen are determined for all animals after challenge dose. Metal concentrations are determined by atomic absorption spectrophotometry.

Results to date show that: 1) No immediate or delayed allergy to palladium was induced in guinea pigs or rabbits by s.c. injection of PdS04. 2) No significant level of palladium was found in the serum of guinea pigs or rabbits injected s.c. with PdS04. 3) No significant level of palladium was found in the spleens of guinea pigs or rabbits injected s.c. with PdS04. 4) Significant levels of palladium were found in the urine of guinea pigs and rabbits injected s.c. with PdS04.

R803037

The objectives of the proposed research are (1) to provide an objective comparison of the benthic algal communities occurring on particular substrate types in the Upper Great Lakes. This information should serve both to point out areas that are presently being adversely affected by accelerated eutrophication and to provide baseline information against which possible future changes may be judged, and (2) an effort will also be made to reconstruct, insofar as is possible, the original status of such communities by recovery and analysis of historic collections from the region. Knowledge of the changes that have occurred in the benthic algal communities could provide insight into the slow and minute changes that have occurred in the Great Lakes.

The general approach of the proposed research involves the recovery of historic collections and collection of new data on previously unanalyzed sample sites. If recent collections are not available from the more important historical sites, collections will also be repeated.

The staff at the University of Michigan is amply qualified to perform the taxonomy on the benthic algal communities. Their laboratory contains a more than adequate array of microscopes and instruments to describe the changes that have occurred over the past 100 years.

R-803059-02

Objective: To investigate surface stability of and salt movement in fine-textured (TOSCO) and moderately coarse-textured (U.S. Bureau of Mines gas combustion process) spent shales and spent shales covered with soil after vegetation has been established by intensive treatments and then left under natural precipitation conditions.

Approach: Field plots using spent shale in the oil shale region of Colorado at elevations of 5700 and 7200 feet.

Current Progress: The lower elevation plots were established in 1973. Salt movement back up into the previously leached fine-textured spent shale has been greater than predicted. Observations are continuing on salinity, surface temperatures, moicture, and vegetation. The desired cover of vegetation has not as yet been established on the high elevation plots.

## R803065 02

(1) The objectives of this project are to measure the size distribution of outdoor urban atmospheric particulates using a Time of Flight Aerosol Beam Spectrometer (TOFABS), and to discover, in the course of these measurements, the capability, advantages and problems of the TOFABS method.

(2) The TOFABS method is based on the fact that when an aerosol accelerates through a small nozzle into a vacuum chamber, the smaller particles reach higher terminal velocities in the cacuum chamber than the larger particles. Measurement of particle times of flight (T)F) between two focused light beams of fixed separation can therefore be used to obtain the aerodynamic sizes of the particles.

This technique has the advantages of the scattered light measurement method (fast, automatic processing and storage of data) without the major disadvantages (background scattering from air molecules, complex theory relating scattered light intensity to particle size). Thus, not only the measured data is of interest but also the demonstration of the capability of the TOFABS technique.

(3) Current plans are to assemble laboratory and field model TOFABS and use these in a series of calibration measurements of laboratory and outdoor aerosols and, finally, in a series of measurements of outdoor urban aerosols.

## R803066 02

This study has the objectives: (a) to evaluate the effectiveness of offstream detention-retention of surface stormwater runoff as sediment control devices and (b) to establish technical guidelines to aid designer in selecting the most efficient detention-retention facility. Available field data has been assembled and analyzed to evaluate the efficiency of various types of control measure. Computer program has been developed for evaluating trap efficiency based on fundamental principles of hydraulics and sediment transport. The computer program work will be checked by the field data. It is envisioned that with this theoretical approach the design can be safely extrapolated beyond the data range available. Other factors such as costs of construction and maintenance will also be considered in establishing technical guidelines.

803069

The objectives of the short course is to introduce the concepts and modeling techniques associated with the prediction, control and management of urban stormwater problems. The participants are anticipated to be from consulting firms and government agencies specializing in water resources and water quality systems design, management and planning.

A five day short course is scheduled to be held at the University of Massachusetts during the summer or fall of 1974. Guest speakers representing the distinguished personnel in the field will present seminar-type lectures during the short course. Special attention will be given to the use of the Environmental Protection Agency Stormwater Runoff Management Model (SWMM) to analyze urban stormwater problems. The lectures will be augmented by a series of case studies and workshops dealing with the technical aspects of using the computer model. An extensive set of notes will be published and distributed to participants prior to the course.

R803079 02

1. Objectives of this study are to demonstrate the effectiveness of several surface configurations in: controlling erosion, run-off, sedimentation and pollution of adjacent drainages; quickly producing a desirable stabilizing vegetative cover; creating an equilibrium between precipitation absorbed and soil moisture evaporated and transpired so that ground water pollution will remain minimal; producing an overall desirable reclamation design providing effective drainage, esthetics productiveness and use.

2. Surface mined study areas ranging in size from forty to sixty acres were selected near Colstrip, Montana, Savage, Montana, and Beulah, North Dakota.

3. Intensive meteorological, surface runoff and water aquifer level monitoring will be accomplished with automatic data logging systems. Five 0.21 hectare microwatersheds have been constructed at each area to intensively evaluate each of the five surface manipulation treatments: chiseling on raw spoils, gouging on raw spoils, chiseling on topsoil, gouging on topsoil, and dozer basins on topsoil. Treatments will be initiated during late March or April.

## R803097 02

Continuation of the synthesis and/or purification of high-purity (99.9% goal) polynuclear aromatic compounds, chiefly hydrocarbons for possible use as analytical standards, is proposed. These hydrocarbons are of the types found in the products of incomplete combustion (automobile exhaust gases) and hence appear as environmental pollutants. The list of 22 PNA compounds on the original proposal (now identified as R-803097-01) may be divided as follows:

1) Hydrocarbons under preparation or completed:

   - Anthanthrene
   - Benz[*a*]anthracene
   - Benzo[*b*]fluoranthene
   - Benzo[*j*]fluoranthene
   - Benzo[*a*]pyrene
   - Fluoranthene
   - Pyrene
   - 1,3,5-Triphenylbenzene
   - Triphenylene

2) Organic Compounds proposed as future work:

   - Acridine
   - Benz[*a*]acridine
   - Benz[*c*]acridine
   - Benzo[*k*]fluoranthene
   - Benzo[*mno*]fluoranthene
   - 11H-benzo[*b*]fluorene
   - Benzo [*ghi*]perylene
   - Benzo[*e*]pyrene
   - Coronene
   - Dibenz[*a*,*h*]anthracene
   - Indeno[1,2,3,*cd*]pyrene (*o*-phenylenepyrene)
   - Perylene

It should be noted that chrysene has been withdrawn from the original list at EPA request, which reduces the total to 21.

In general, known synthesis routes are used, but their improvement is sought through use of new reagents and techniques. High-pressure liquid chromatography and/or zone refining is included in the purification procedures. Modern analytical techniques (glc, lc, tlc, nmr, mass, and other spectrometric techniques) are used for identifying compounds and establishing the purity of the synthesis products.

## R803109 02

**1. Objectives:** (a) Design an optimized single-ended lidar system based on the first year's preliminary field test results, to accurately measure both $NO_2$ and $SO_2$ produced by stationary sources and present in ambient conditions. Calibration measurements will be made to determine accuracy versus distance and laser power output to permit specification of different system parameters for different conditions. (b) Evolve operating parameters for extending the system for similar measurements of $O_3$. **2. Approach:** (a) A systematic study and error analysis will be made for a comparison between simultaneous multi-wavelength and sequential operation of the lidar system Measurements will be made of effects of bandwidth on doubling and on range and accuracy with the objective of simplifying the system while maintaining accuracy. (b) Use the techniques developed for $SO_2$ in the first year to evolve suitable parameters for an $O_3$ measurement system. **3. Progress** so far in the first year has resulted in the development, from inception, of a system to monitor $NO_2$. Field tests have been carried out with this at ranges of over 1000 meters. Both sequential and simultaneous output wavelength systems were developed. Similarly, a system using frequency doubling to monitor $SO_2$ is nearing completion and preliminary field tests will be carried out with it within the current year's program.

R803111 01

Recently it has become apparent that there is a real need to establish the level of exposure to VCM of workers in the vinyl chloride/ polyvinyl chloride (VCM/PVC) industry. This need was triggered by reports in January 1974 of the deaths of 4 workers in the industry believed attributable to VCM exposure.

As a result of the potential seriousness of the VCM problem and the findings of the preliminary monitoring work, Battelle-Columbus feels that a detailed study to assess the magnitude of this problem is needed. As a first step, the Institute proposes that a research program be initiated to establish the rate and extent of VCM emissions from the sludges produced in VCM polymerization facilities. The program, as defined below, would consist essentially of (1) sampling of polymerization sludges from 4 plants, representative of the VCM polymerization industry, and (2) analyses of the VCM content of air samples at the disposal sites and of VCM emissions from the sludges under controlled conditions in the laboratory.

Battelle-Columbus' research approach to this problem would involve (1) collecting samples of ambient air and reactor sludges at the selected sites, (2) transporting the samples to Battelle for study, (3) measuring the VCM contents of the air samples, and (4) monitoring VCM emissions from the sludge samples under controlled experimental conditions simulating the natural environments contacted by the sludges. It is anticipated that the U.S. Environmental Protection Agency would select the 4 industrial sites at which sampling is to be performed.

R803113 02

Submitted with original application

R803120 02

The hypothesis underlying this work is that the Dinoflagellate Peridinium blooms when the medium is too poor, expecially in P, for the green algae and diatoms to continue their development. Since Peridinium produces considerable biomass because of its high C:P ratio we have a peculiar situation where high biomass values are found at low P levels and much lower values are measured at higher P levels when diatoms and green algae take over. A prerequisite to such an hypothesis is that Peridinium is able to take up P at lower concentrations than the small algae which represent its main competitors. Consequently a large part of our program is devoted to measure the $P_{Km}$ of Peridinium and of 5 species of green algae and diatoms common in the lake before the Peridinium bloom.

Another part of our project consists in measuring in situ the P contribution of the sediments. Preliminary results (report no. 2) show that the oxidation of the organic P or the upper layer seems to be the mechanism of P supply by the sediments.

R803131 02

TASK 1: The specific objectives of Task 1 in the second year of funding will be to determine rate constants for reaction of OH with p-xylene, m-xylene and ethyl benzene. In addition to the above rate measurements, mechanistic information will be obtained (i.e. primary and/or secondary products) on the reactions of OH with the compounds propylene, 1-butene, cis-2-butene, tetramethylethylene, benzene, toluene, xylene and ethyl benzene. The techniques to be employed in this study are (1)Flash Photolysis-Resonance Fluorescence and (2) Laser Flash Photolysis-Time Resolved Mass Spectrometry.

TASK 2: The objective of Task 2 will be to collect an extensive data base on the concentrations of the trace gases NO, $NO_2$, $SO_2$, Ozone and on particles in oil fired power plant plumes located in northeastern United States. This data will be collected via small aircraft at distances up to seventy miles when possible. Before, during and after each sampling flight, meteorological data will be collected to provide as complete a meteorological history as possible of each sampling expedition. At least two different oil fired power plants will be examined in this study.

R803141 02

Studies of the interaction of surface slick microorganisms and selected organochlorine pesticides are in progress. The effects of heptachlor and other chlorinated hydrocarbons on the fatty acid and hydrocarbon metabolism of surface slick microorganisms are being investigated. The activity of selected microorganisms is being evaluated in an hexadecane-heptachlor ($^{14}C$) model system. The accumulation and/or biodegradation of pesticides by bacteria, yeasts, and filamentous fungi is being considered in regard to their primary role in food webs.

R803143 02

(1) Objectives - a. To establish replicate, flow-through microcosms under controlled conditions in the laboratory containing marine plankton and benthos
b. To use these microcosms to measure the effects of different intensities of sewage-related stress on the stability and resiliency of coastal ecoystems.
c. To measure the effects of interacting and time-varying stresses associated with ocean dumping on the microcosm.

(2) Approach - Whole water samples of the coastal plankton and benthos communities in lower Narragansett Bay, RI, will be maintained in flow-through laboratory microcosms with a turnover time of 35 days. A complex artificial sewage and a mortality stress will be applied singly and in combination continuously and in time-varying mode to replicate tanks at various intensities.

(3) Progress - The physical microcosm facility has been constructed, consisting of a large volume water bath, 12 microcosms (200L each), high intensity lights with appropriate spectial composition, benthic community chambers coupled to the pelagic tanks, and turbulence levels similar to an open bay. Preliminary experiments have shown good replication, and we are now ready to begin substantive experiments.

803151-01

Grant Amendment - Provides for additional work including: (1) an assessment and state-of-the-art investigation of the problems of root intrusion and tidal and backwater intrusion in sewer systems, (2) an expanded investigation and evaluation of equipment and materials used for infiltration/inflow detection sewer system evaluation, rehabilitation and construction.

R803168 02

Federal Regulations specify that a type-S pitot tube is to be used to determine the velocity and volumetric flow rate of a gas in a stack. This information is used in conjunction with measurements obtained with a sampling probe to determine pollutant emissions from a stack. In order to convert the measurements of type-S pitot tubes to velocity and flow rate, regulations recommend using a nomograph which assumes a tube coefficient of 0.85. Users, however, have reported coefficients from 0.65 to 0.96 for commercially obtainable type-S probes. This variation can significantly affect the calculated gas velocity and flow rate, which, in turn, gives inaccurate predictions of pollutant emissions from a stack.

The continuation into the second year of a two year research project is proposed. In this project the North Carolina State University Subsonic Wind Tunnel is being used and is to be used to investigate the design, construction and use of type-S pitot tubes. In the first year the research project involved the (1) calibration of several type-S pitot tubes, (2) evaluation of the effects of geometry changes in the probe and (3) evaluation of the interference effects due to the presence of a sampling probe. The second year will involve studying the effects of (1) misalignment of the tubes with respect to the gas flow direction, (2) turbulence and cyclonic flow conditions, (3) bending the tube after calibration and (4) length of tubing between tube and manometer.

The results of the investigation will be used to determine specifications for the standardization of type-S tubes and for their use with a sampling probe to accurately estimate total pollutant emissions from a stack.

803178 01

The assessment of the distribution and production of zooplankton in southern Lake Huron with regard to sources of pollution, as well as the determination of the capability of zooplankton to graze pollution-indicating phytoplankton, constitute the principal objectives of this project. Our approach to the first problem will be two-fold: firstly, to sample the zooplankton with both nets and acoustically, and secondly to process such field data using proven actuarial indices, including birth and death rates, in order to relate production of zooplankton to water quality. Our approach to the second problem, that concerning the feeding by zooplankton upon nuisance algae, will involve the use of tagged ($^{14}C$) foods and scintillation counting ability to graze blue-green algae will be related to the dominance of such forms in perturbed areas of Lake Huron. Our research team has experience on large lakes, having applied methods of assessing secondary production during a study of Lake Ontario (IFYGL).

R803213 02

In 1975, the Montana Power Company will begin operation of a coal-burning power plant near Colstrip, Montana. One of the primary emissions of a coal-burning plant is $SO_2$, which is known to have a detrimental effect on vegetation. EPA will have a Zonal Air Pollution (ZAP) system operational by spring, 1975, which will simulate various $SO_2$ emissions from the power plant. Comparisons will then be made between components of the ecosystem affected by the power plant emissions and those affected by the ZAP system. Measurements obtained from lichens subjected to those two conditions will then be compared with baseline observations begun in 1974.

The objectives of the continuation study are: 1) to determine morphological and physiological sensitivities of _Usnea hirta_ and _Parmelia Chlorochroa_ to $SO_2$ emissions at various concentrations as observed on the ZAP site, a grassland. 2) To use the _Usnea_ and _Parmelia_, and perhaps the lichen communities, as indicators of the $SO_2$ emissions effects from the power plant on the lichens on the test sites and on Ponderosa pine sites. 3) To monitor two grass species, using the same characteristics as those tested in the lichens, to see if a difference in relative sensitivities between these vascular plants and associated lichens can be detected.

Field work has included specimen collecting, community characterizations, and some transplanting. Laboratory activities include morphological and physiological observations of _Usnea hirta_ and _Parmelia chlorochroa_.

R803224

The primary objective of the project is to evaluate the effectiveness of the modified box cut method of surface mining in reducing the impact on the surrounding environment.

The proposed work will be conducted at a working site on Trace Creek in Mingo Co., West Virginia, and will consist of the following tasks: (1) Determine environmental baseline parameters; (2) Documentation of mining operations (procedures); (3) Monitoring of environmental impacts during mining operations; (4) Acquire historical data on environmental impacts of other steep slope mining activities; (5) Document recovery of mined area; (6) Comparative analyses of various sites to the Trace Creek site; and, (7) Preparation of progress and final reports.

The proposed schedule is 24 months.

R803242 02

Objectives: The objective of the research on coal nitrogen is to determine a partial mechanism, and corresponding rates, of conversion of organically bound nitrogen to stable nitrogen bearing products under combustion conditions. The objective of the research on particulate organic matter is to determine, within laboratory flames and in the exhaust gases, (a) the size distribution, concentration, and total mass of soot particles, (b) the identity, concentration, and total amount of organic compounds, and (c) the relationship between soot and organic compounds.

Approach: The approach in the coal nitrogen study is to close a nitrogen material balance by analyzing solid and gaseous products of high temperature coal pyrolysis. Coal particles are heated to combustion temperatures by a surrounding preheated inert gas stream in a high temperature furnace. The study of particulate organic matter is based on the collection of samples, using a molecular-beam instrument in low-pressure premixed flames and a water-flushed probe in diffusion flames at atmospheric pressure, and sample analysis by high resolution electron microscopy, on-line mass spectrometry, and combined gas chromatography-mass spectrometry.

Current Plans and/or Progress: Experimental apparatus has been assembled and exploratory runs have been completed. Systematic collection of data is now in progress.

## R803244 02

The world has reached the time when it must consider itself a closed and balanced living system. The ability of a locality to unknowingly pollute to death a region or localized subsystem is well documented. The time has come for answers that quantitative, fast and accurate evaluations of how a change in the environment of a given species will affect its well being. This is more complex than determining lethal doses of environmental change. The information as to how the behavior of an organism is affected with sub-lethal doses is much more difficult to ascertain - more complex than observing life or death - it pertains to changes in the norm of behavior and these changes may be subtle.

The proposed system for the retrieval and analysis of these behavioral data will include a video camera to record the movements of organisms - either their whole body or perhaps focused on an appendige or a motor mechanism. The image will be quantized and rendered to a dedicated mini-computer by a specially built piece of hardware. The software will be developed to acquire these data in real time, perform an analysis as directed by the user via keyboard commands with an interactive display available for viewing and editing these data. In order to allow other installations to utilize these programs, they will be written in a language that is machine independent to the extent possible. The system will allow data to be accumulated for individual organisms as well as groups of the organisms.

## R803249 02

To develop a laboratory model ecosystem based on the corn-soil, soybean-soil, and cotton-soil complexes, where radiolabeled pesticides can be evaluated for total environmental fate, distribution in various living organisms, degradation products, and biological effects. The chemicals evaluated in these systems will be those selected by EPA under the substitute pesticides program. The systems have been defined and evaluated during year I and work during year II will consist in the evaluation of the substitute chemicals and comparisons with standard materials such as DDT and aldrin.

R803254 03

The principal objective during the first year was to test the significance of differences in reported symptoms classified by type associated with swimming at a beach which is "barely acceptable" in respect to local criteria for recreational waters, compared to a "relatively unpolluted" beach. The principal objective during the second year is to place four beaches on a water pollution gradient to establish a mathematical relationship between symptoms classified by type and water quality indicators. This work is an integral part of Recreational Water Criteria Program efforts to develop health effects criteria for marine recreational waters.

Trials consist of initial beach interviews on both the Saturday and Sunday of the same weekend and telephone or mail follow-ups 8 - 10 days later. Pretests in 1972 - 73 indicated that beach interviews and follow-up questionnaires yield accurate data on demographic characteristics, bathing activities and subsequent symptoms of the population at beaches on weekends. In the first year, four weekend trials were conducted on two New York City Beaches. In the second year, four sites on a pollution level gradient at a New York City beach will be selected; four weekend trials will be conducted at each.

R803255 02

Experiments performed in our laboratory suggest that the ability of coliforms to populate the gastrointestinal (GI) tract of warm blooded animals is related to their endogenous levels of lysine decarboxylase (LDC). That is, those coliforms with a high endogenous LDC content may have a selective advantage in establishing themselves in the GI tract over those coliforms with a low endogenous LDC content. These results suggest that the ability of a coliform to synthesize cadaverine endogenously (1,5-diaminopentane) may determine whether it is of fecal origin. We plan to test this hypothesis more directly by introducing LDC positive and LDC negative coliforms into the GI tracts of warm blooded laboratory animals and determine the washout rate of these organisms from the GI tracts of these animals. In addition, we plan to isolate coliforms from the feces of human volunteers and determine directly the endogenous LDC levels of these organisms. In this way, it may be possible to redefine more accurately the term "fecal coliform" and develop a simple, accurate, in situ test for fecal contamination of both recreational and drinking waters.

R803281 01

The research will involve measurement of the chemical and microbiological status of agricultural land that has undergone treatment with undisinfected municipal sewage waters for the past 15 years. Specifically, the quantities of P, N, As, Cd, Cr, Hg, Ni, Zn, Cu, and Po in soils and drainage waters will be measured. The content of these elements in crops grown on the land will also be measured. Control areas not having received sewage waters will be sampled for comparative purposes. The objective of this portion of the study is to obtain the facts required in making recommendations on the management of agricultural lands receiving inorganic chemicals in sewage waters. The microbiological portion of the project will be designed to measure the population of pathogenic bacteria, viruses, and parasites in the soils and drainage waters. Soil biota will be examined to determine if they harbor more pathogenic organisms than similar organisms found on agricultural lands not receiving sewage waters. Metal columns filled with soil from the sewage farm will be used in studying the absorption and movement of *Salmonellae* in soil. The results of the biological portion of the study should provide some basis for evaluating the public health effects of applying sewage waters to agricultural soils. It will also provide the information needed in managing such soils to minimize potential public health hazards.

S803312 01

The overall objective of this research is to reduce the pollution resulting from the blanch and cooling of vegetable for freezing.

In order to accomplish this objective the following approach will be used:

1. A 1 ton/hr, vibrating conveyor steam blanching and cooling pilot plant that uses air with blancher condensate as a fog spray for cooling will be designed and constructed.

2. The pilot plant will be installed and demonstrated in a frozen food plant where the effluent volume and BOD will be compared to a conventional blanch-fluming process.

3. Product quality and yield as well as capital and operating costs for the new system will be compared to the conventional blanching and fluming process carried out concurrently.

The proposed blanching-cooling technique has been tested on a small scale at the Western Regional Research Center for the past year. It has been found that the COD produced in a simulated conventional blanching fluming system could be reduced by 50 to 75%.

## R803322 02

Objectives: To develop remote sensing and ground level techniques to follow effects of coal burning power plants on natural vegetation and to apply these techniques to monitoring real changes following power plant construction.

Approaches: Conventional and low-level aerial photography are coupled with ground studies of plant community structure, pattern, and diversity.

Progress: Study areas have been selected and described. Photointerpretation and phenology studies were hampered by late start in 1974. Diversity analyses appear promising; data analysis still under way. Baseline data being accumulated.
Current plans: Continuation of field work; preliminary data to be collected on artificially stressed site.

## R803328 02

The ultimate objective of a feasibility study is to design and characterize a survey plan to make the desired measurements and to estimate the precision to be expected from a survey along with the cost of the operation. Precision is not always linear to cost and usually it is desirable to know the precision to be expected over a range of costs.

The objectives of the second year of this two-year study are:

1. To develop and evaluate a sampling survey design and field techniques required for rural runoff evaluation, model development and verification involving small drainage sub-basins, with compatible emphasis on:
    a. Evaluating cost of various sampling precision levels including a comparison of grab techniques with instrumental methods.
    b. Evaluating modeling techniques for determining input from rural runoff and effect on the chemical and biological characteristics of receiving streams.
    c. Determining relationships between land use, physiography, physical and chemical values, rainfall-runoff, and the impact of these factors on receiving streams.

R803344

The objectives of this study are to determine the population of Salmonellae in Texas feedlots and to determine the survival of Salmonellae in agricultural soils that are potentially important for utilization of animal wastes. Manure in pens containing sick animals will be sampled to determine populations of Salmonellae under optimal conditions for their development. Representative feedlots in various geographical areas of Texas will be used. The major area to be sampled will be the High Plains. The major agricultural soil in each geographical area sampled will be used for studying the survival of Salmonellae in soil. The soils will be incubated in the laboratory at different temperatures and will be sampled at weekly intervals. Because the rate of manure application affects the survival of Salmonellae several rates of manure will be used. Before widespread indiscriminate use of land for disposal of animal manure occurs the potential effects the practice may have on public and animal health needs to be determined.

R803346 02

The sole purpose of disinfecting potable water supplies is the destruction of pathogenic organisms and, thus, the elimination and prevention of waterborne disease such as thos caused by viruses. The overall objective of the study is to determine the range of sensitivity of various enteric viruses (e.g.picornaviruses) to chlorine. Using carefully controlled laboratory experiments, the sensitivity response will be characterized with respect to such variables as type of virus, level and nature of chlorine, and quality of the suspending medium (water). Both chlorine demand free water and natural waters will be used. The sensitivity of viruses continuously maintained under laboratory conditions will be compared to new isolates obtained from fecal matter. The mechanism of inactivation, with respect to whether the viral genome or protein coat is affected, and whether the inactivation is reversible, will also be examined.

R803360

There are approximately 100 enteric viruses of human origin which have been isolated from sewage, rivers, sea water and water supplies. Despite concern for the presence of these viruses, there is as yet no rapid practical assay for their identification and detection. We propose to apply immunoenzymatic methods currently under development in our laboratories which will satisfy this need. These methods will increase the reliability of and decrease the time required for identiication of these viruses. In addition, the methods we propose may also be applicable for virus detection.

The proposal consists of two phases of methodology: 1) identification of enteric viruses by immunochemical staining of virus-infected cells with enzyme-labeled antibodies and 2) identification and quantitation of enteric viruses by enzyme immunoassay. The first phase has been developed by us for use in identifying selected enterovirus types; this will be extended to include identification of all enteric viruses that can be readily cultivated. The second phase will be development of methods for identifying and quantitating cellular or extracellular virus. This method involves reaction of enzyme-labeled antibodies with viral particles; virus is identified and/or quantitated by assaying bound enzyme.

R803395 02

The study involves the characterization of a recently discovered virus of the pink shrimp, Penaeus duorarum. The relevance of this study resides in the fact that the shrimp virus is remarkable similar to insect viruses of the Baculovirus group which are being applied as biological pesticides for the control of certain agricultural insect pests. This is the first report of a virus structurally similar to the occluded insect viruses as infecting invertebrates other than insects. The research will direct activities toward investigatin the biochemical, structural and biological properties of the shrimp virus as compared to known similar properties of the insect granulosis and nuclear polyhedrosis viruses. Characterization of the shrimp virus will aid in developing specific monitoring systems for the detection and survey of the disease as it exists in nature and thereby evaluate the extent of seriousness. Also, such studies will begin to increase our understanding of the capability, or potential capability, of certain viruses being utilized as biological pesticides in non-target invertebrate systems, and conversely.

R803399 02

The objective of the study is to evaluate long path laser monitoring of ambient level air pollution. The lasers that have been considered are semi-conductor diode tuned lasers and sequentially step tuned carbon dioxide lasers. Systems employing both techniques were tested during the summer of 1974 in St. Louis in connection with the Regional Air Pollution Study (R.A.P.S.). However, only the diode tuned laser system will continue to be tested during the summer of 1975.

The present plan is to use the laser system to make pollution variability measurements around two one kilometer square areas in the St. Louis area as a part of RAPS. One site will be urban and the other rural. A concurrent study will be urban and the other rural. A concurrent study will be made of the same area using portable monitors and bag samples. The results of the two methods will be compared.

Assuming favorable results from the comparison, it is planned to use the system during the summer of 1976 to make several pollutant variability studies for carbon monoxide, nitric oxide and ozone.

R803430 01

The objectives of this research grant are to refine and develop the hardware and system design for a portable pyrolysis unit. This system is to convert various types of agricultural wastes into useful, saleable fuels, such as char, oil, and gas. Initially, wastes sutided under this program are to be selected from such candidates as cotton gin trash, peanut hulls, and bagasse. Hardware of this general type has been under development by Georgia Tech for several years and the results have been very encouraging, based on laboratory, pilot, and near-full scale hardware tests. Although the system has already been scaled up to commercial size in an operating plant pyrolyzing wood waste, a few additional hardware refinements are indicated for processing harder to handle wastes such as those listed above. The study will include some fourteen or more instrumental test run with complete data analysis.

S803459-01

The purpose of this project is to develop an improved chlorine contactor design system to accomplish three primary objectives: (1) Develop and demonstrate an optimum design chlorine mixing and contacting system that will provide effective disinfection with low chlorine-induced toxicity; (2) Develop uniform tests that will provide a meaningful method of measuring the true performance of chlorine contactor systems; (3) Use the information obtained to develop a manual of design and practice for wastewater chlorination systems.

The objectives are to be accomplished by designing and constructing a trailer-mounted idealized chlorine mixing and contacting system and a trailer-mounted bioassay laboratory. A "slip-stream of effluent from eight different full-scale wastewater treatment plants will be chlorinated in parallel with the flow being processed in the plants. Both streams will be evaluated for reduction in bacterial numbers to specified levels and for toxicity to receiving water biota. Results of the project will be used to produce a comprehensive manual on the subject of wastewater chlorination and chlorine-induced toxicity.

S-803468-01

(1) Objectives - a. Evaluation and improvement of the technology of sludge composting with particular emphasis on raw sewage sludge composting.
b. To determine the agricultural and land use potential of the compost.
c. To determine any environmental aspects affected by compost application to land.

(2) Approach - a. Design and improve the present system of static aeration and windrow composting with emphasis on odor control and pathogen survival.
b. Greenhouse and field studies on soil nitrogen mineralization, heavy metal uptake by crops and pathogen survival in soils.
c. Movement of nitrogen in soil; soil contamination and reactions of metals and organic matter.

(3) Current Plans and Progress a. An aeration system was developed which appears to compost raw sewage sludge without odors. Difficulties were encountered with winter windorw composting and various modifications of the system will be tested. Pathogen survival during composting will be studied.
b. Preliminary studies in the field and greenhouse indicate that heavy metal availability from compost is less than from sludge when applied to soils. Nitrogen mineralization studies are necessary so as to determine application rates.
c. Plans are to study heavy metal-organic matter interaction.

R803486 01

A variety of chemical agents in our environment have been shown experimentally to alter the activity of the microsomal enzyme aryl hydrocarbon hydroxylase and thus influence the carcinogenicity of several polycyclic aromatic hydrocarbons (e.g., benzo (a) pyrene). Information is lacking, however, on the influence of exposure to widely used organophosphate insecticides on the metabolism and carcinogenic action of these agents. We have shown that subacute administration of the insecticide parathion or its active metabolite, paraoxon, to rats inhibited the *in vivo* and *in vitro* metabolism of benzo (a) pyrene. As part of a collaborative project with the Department of Pathology, this study has the goal of determining whether exposure to low levels of organophosphate insecticides (e.g., parathion) affects the metabolism and carcinogenicity of benzo (a) pyrene. Ha/ICR mice will be used, since this strain is highly susceptible to benzo (a) pyrene induced pulmonary and stomach tumors. To achieve the objective it is necessary (1) to determine the relationship between the level of parathion exposure (feeding for 90 days) and the incidence of benzo (a) pyrene induced tumors, and (2) to measure the level of benzo (a) pyrene and its metabolites (e.g., benzo (a) pyrene-epoxide) in lung and stomach in order to understand better the mechanisms of any observed interactions involving carcinogenesis. The data obtained might provide some basis for evaluating the potential hazards to public health of combined exposure to insecticides and carcinogenic hydrocarbons in our environment.

803490

This investigation comprises a study of the applicability of electrochemical systems and procedures to the detection of inorganic species in industrial and domestic wastes. By utilizing the techniques of anodic stripping voltammetry (ASV), cathodic stripping voltammetry (CSV), and scanning coulometry with the conducting glass electrode (CGE) and the composite mercury graphite electrode (CMGE), it should be possible to effect the rapid analysis of trace metals and other inorganic substances in complex matrices. In addition, this study should be instrumental in providing a method for the rapid evaluation of stability constants of metal complexes in industrial and domestic effluents.

803508-1

It is proposed to write a manual of step-by-step procedures by which mine operators, laboratory analysts, consultants, and State and Federal agencies and land owners can determine properties of overburdens and minesoils needed to assure soil and water quality.

The procedures will include field identification of common rocks and minerals; field sampling techniques; packing, transport, and processing of rock and soil samples; chemical, mineralogical and physical analyses; and interpretation of analytical results into field recommendations. These recommendations will be designed to aid preplanning of the total surface mining operation including post-mining reclamation and long-range land use, insofar as these are influenced by the character of the rock and soil overlying the coal seam. The manual will support the concept of controlled segregation and placement of overburden during surface mining to assure soil and water quality.

Terms used in the manual will be defined and will be an important part of this project. Such standardization would greatly benefit communication between the multiple disciplines involved.

R803509 01

The object of this program is to provide an instrument which can be mounted on a stack and continuously monitor the mass concentrations of particulate emissions. An optical method based upon the measurement of the depolarization of back scattered polarized radiation exhibited by particulate matter in a gas stream is being investigated. The feasibility of correlating the results of these depolarization measurements with the mass concentration of particulate matter is presently being established in the laboratory using well defined model and fly ash aersols under flowing conditions.

R803510

The overall objectives of this project are to further develop and refine efficient rapid and inexpensive monitoring methods for the detection and quantitative assay of low levels of viruses in large volumes of water and wastewater, and to evaluate various promising virus monitoring and detection methods by standardized and controlled procedures.

The specific objectives are:

1. To evaluate a number of the most promising virus (including Australian Antigen) monitoring and detection methods under laboratory and field conditions by standardized and controlled procedures with the aim of identifying the most effective method or methods for routine monitoring operations.

2. To improve, test and compare new monitoring methods including modern ultrafiltration and concentration of viruses and Australian Antigen from water by magnetic fields.

3. To develop a rapid method (24 hours) for detecting viruses in water by the use of the fluorescent antibody method or other possible methods.

R803520-01

The objective of this study is to collect data on the emissions of sulfate, particulate, hydrocarbon, carbon monoxide, and nitrous oxide and on fuel economy characteristics from a fleet of in-use production catalyst vehicles by periodic testing. The selected fleet of 80-100 vehicles will be tested at 3,000 mile intervals by the 1974 Federal Test Procedures and at steady cruise; in both instances, with simultaneous dilution tunnel particulate collection and gas analysis. Except for an hour meter and fuel totalizer, each vehicle will be stock, and will be tested "as is" with collection of a tank fuel sample for analysis. Duration of the study is two years.

S803522 01

The wastewater from seafood processing plants is more concentrated than ordinary domestic sewages thereby necessitating a project to examine the various method of treating wastes from such plants, including regional systems, in order to determine the most cost effective method, including disinfection, before discharging wastewater to land or State waters. The value, if any, of recoverable material will be determined for each of the treatment methods investigated. While the project is primarily intended to yield results to be used in seafood processing plants too remote from municipal sewerage systems to permit connecting to them, the project will also investigate pre-treatment systems most economically feasible for those few processing plants which are or could be connected to municipal sewage systems. The monitoring and sampling of effluent will be included in the project so that a conclusion can be reached as to the most logical and reasonable system needed to maintain receiving water quality and to this end, both sampling requirements (i.e., for BOD5, suspended solids, dissolved solids, Ph, coliform, etc.) and frequency of sampling will be determined. Following the investigation stage it will be essential to test the conclusions of that phase with one or more demonstration projects. The ultimate goal is to determine the best practicable technology by 1977 and the best available technology by 1983 for the plants processing blue crabs, oysters and clams in the Chesapeake Bay area, including Maryland, Virginia and Delaware.

R803523 01

The general objective of the Symposium will be to provide an opportunity for presentation and evaluation of current research and operational findings dealing with the assessment and control of eutrophication. The specific objectives will be to a) provide an environment conducive to the exchange of technical information in a pleasant and efficient manner, b) provide professional contact and communication between engineers and scientists that will lead to a better understanding of the methods available to upgrade existing wastewater lagoons, and c) provide a Proceedings of the Symposium that will allow non-participants to benefit from the meeting.

The major objective of this proposal is to determine the distribution, environmental requirements, and life histories of the most widely distributed and/or representative species of stoneflies of the United States. As a basis for this work the research conducted by other stonefly workers will be used for comparison and background information. The work of Nebeker (1970) on the effects of high winter water temperatures on the stonefly, Pteronarcys dorsata, and the effects of low oxygen concentration on the survival and emergence of Pteronarcys dorsata and Acroneuria lycorias, Nebeker (1972) provides comparative data for similar work conducted by the principal investigator. The effects of low pH on the survival and emergence of these two species of stoneflies plus 2 others by Bell (1971) provides data for this ecological factor for the Great Lakes Region.

Research already underway by the principal investigator in Florida and New Hampshire will provide considerable data on the ecology of stoneflies of those states. A cooperative study with Dr. William Peters and his associates at Florida A. and M. has provided specimens and data for a paper which should be completed within the year entitled the "Stoneflies of Florida." The principal investigator of this proposal spent several days in September 1973 collecting stoneflies from Hubbard Brook, New Hampshire, and as part of this project proposes to utilize specimens of stoneflies and data to be collected by a graduate student from Cornell who is undertaking a study of the mayflies of Hubbard Brook.

As a major part of the project herewith proposed the principal investigator plans on collecting stoneflies and ecological data from streams in the Smoky Mountains and other streams in Tennessee, North and South Carolina extending northward to the Shenandoah Mountains of Virginia. This work is planned from early March 1975 to mid June. A sizeable collection of stoneflies from Wildcat Creek in South Carolina and the collection of stoneflies of the Natural Academy of Sciences of Philadelphia have already been identified to provide a further basis for the research proposed.

Inasmuch as the species of stoneflies in eastern and western North America are different with very few species and perhaps none of the same species extending from coast to coast except in Canada, a special attempt will be made to collect species from the eastern states as closely related to Rocky Mountain species as is possible. With over 500 species of stoneflies having been reported from North America it would be difficult and unpractical to attempt to include all of the species that have been collected in the United States in this study. The study will therefore be limited to widely distributed ans as closely related species from various sections of the country as is possible.

R803539 01

We propose to investigate and evaluate the applicability and practicality of existing local/regional policy instruments in achieving and maintaining environmental quality objectives (air, water and solid waste) over an intermediate planning horizon through the process of affecting the characteristics and location of urban and suburban development and the conversion of rural areas. The policy instruments to be evaluated and tested for sensitivity are: tax policy (property tax rate and valuation provisions), sequencing and timing of capital improvements, and zoning policy. The impact of these tools on the location, timing and milieu of development will be traced. Locational choice for residential, commercial and industrial uses will determine the volume and location of undesirable by-products produced by consumption and production activities.

The linkage and sensitivity of instruments to environmental quality and the accuracy of explanatory and predictive power will be illustrated and tested by tracing development patterns in the Albuquerque, New Mexico region. Our approach depends on utilizing state-of-the-arts knowledge linking tools to environmental quality to the maximum extent possible. Missing and not properly specified or inconsistent links will be formulated through original researuh by the project team. Data and co-operation from the Albuquerque/Bernalillo County Planning Department and the Middle Rio Grande Council of Governments will be utilized in estimating and specifying the overall model.

R803540

This research proposes to determine the combustion temperature and residence time required to effectively destroy pesticides. Thirty-four different pesticide compounds will be examined. Evolved gas analysis will play a major role in measuring degree of thermal decomposition.

Thermogravimetric analysis, supplemented by trapping and subsequent analysis of evolved products, will be utilized. Modified pyrolysis-gas chromatography will be used to accurately determine temperature, residence time, and completeness of termal decomposition.

R803547 01

The projects main objectives are to determine the nature and extent of Non Point Nutrient and B.O.D. pollution in a 340 square mile watershed and evaluate its effect on a 7000 acre reservoir receiving this runoff. This will be accomplished by using two mathematical models. The first to define and allow predictions of the relationship between land use and land management on the extent of non point pollution, the second to describe the oxygen relationships of the reservoir which will allow predictions to be made of what pollution control or reservoir management will be needed to decrease eutrophication and oxygen depletion.

Studies of water chemistry and B.O.D. on about 80 sample sites along with a land use survey will be made in the entire watershed. Additional studies in the reservoir include long term B.O.D. analysis, algal studies, primary production and sediment oxygen-nutrient relationships. A study of various reservoir drawdown levels on reservoir water quality will also be made.

Progress to this point has been to establish sample sites and initiate sampling and analysis in June of 1974 for water chemistry and algae populations, speciation and primary production.

R803548 01

Literature evidence of performance and emissions from automobile engines when operated on methanol or methyl* fuels is very limited when compared to like evidence for gasoline powered engines. The objective of this work is to characterize steady state engine performance and emissions when operating on methanol and methyl fuels. Assessment of methods for the improvement of performance and reduction of emissions will be included.

The work will consist of literature search, base line dynamometer mounted engine performance and emissions evaluation, evaluation of fuel induction systems, and analysis and interpretation of the composite results.

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*Methyl fuel is defined as methanol plus peripheral compounds which may be present from high volume low cost production.

**R803560**

Presently, particle matter collected from stationary sources using the reference method (method 5) is collected at 225-250°F and some arbitrary pressure. Particle size distribution is generally measured by in-stack impactors at stack conditions of temperature and pressure. The primary objective of this research is to develop a source sampling system in which mass loading and size distribution are measured at conditions similar to those which exist in the exit plume. Once such a system is operational, comparisons will be made between particulate collected using current techniques and the particle matter collected at atmospheric conditions.

The approach that will be used in this research is to build a dilution system in which the stack gas can be cooled with dilution air to some reference temperature and collected on the filter face at atmospheric pressure. Several configurations have been suggested and laboratory tests have begun.

**R803561-01**

The proposed research is directed at using fast and highly sensitive battery of genetic tests and simple tests on cell morphological changes in order to critically evaluate the effects of low intensity microwave radiation. Since the non-thermal (less than 1mW/cm$^2$) effects of microwaves are difficult to distinguish from the thermal effects in large whole animal systems, their distinction will be studied at the genetic level using systems well characterized for their thermal responses. Genetic alterations, such as gene-conversion, mutation and chromosomal deletion will be studied using repair-deficient his̄-mutants of *Salmonella typhimurium*; D-4 strain of *Saccharomyces cerevisiae*; ad 3A & ad 3B two-component heterokaryons and excision repair-deficient mutants of *Neurospora crassa*. Gross morphological changes in development, using the filamentous fungus *N. crassa*, will be used to investigate chronic and delayed effects of continuous (CW) and pulsed microwaves, existing in our environment. Work will then be extended to study alteration, if any, of repair process by microwave radiations using human fibroblast cultures.

R803564 01

Bench studies of absorbing colloid flotation techniques are being made to determine their feasibility for the removal of low levels of copper, lead, cadmium, and fluoride ions from industrial wastewaters. $Al(OH)_3$, $Fe(OH)_3$, and $CaCO_3$ are being tested as absorbing colloids, and sodium lauryl sulfate and hexadecyltrimethylammonium bromide are the surfactants being used. Effects of pH, ionic strength, and other parameters are being studied.

## S803565-01

The general objective of this demonstration project is to show the feasibility of alternative water management practices on the quality of drainage return flow and soil salinity in the Upper Rio Grande basin. The project will consist of a 650-acre demonstration site and a 4-acre test site. In the 650-acre demonstration site a combination of present-day irrigation technology will be used to show how through modern water management the return flow quality and quantity can be improved. The feasibility of irrigating at or near 100 percen irrigation efficiency with water of medium salinity (1200ppm), which while maintaining opimum crop yield over a period of many years, will be shown on the 4-acre test site.

A second objective is to evaluate the hydro-salinity computer model for predicting the quality of drainage return flow (developed for the Environmental Protection Agency) on the Mesilla Valley in New Mexico with data obtained during the course of this study supplemented with data from other local, state, and federal agencies.

R803566 01

The Northern Cheyenne Tribe, via the Northern Cheyenne Research Project, desires to develop an in-depth knowledge of the chemical and physical character of reservation water resources, and the interrelation of water to other resources, so that the tribe can make informed choices in planning coal development. A three-year study plan is proposed to: (1) gather and interpret baseline data concerning the water resources and the interrelationships of these data to land, biocommunity, supply needs, and energy resources of the reservation; (2) ascertain potential adverse chemical, physical, and economic impacts to reservation water resources from coal development; and (3) develop a comprehensive water resources management plan that will aid present and future planning for resource exploitation. Standard field and laboratory methodology will be employed in assessing the geology, surface water, and ground water of reservation lands. Professional help will be hired to direct field studies and assist in final report preparation.

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R803568-01

The objective of this project is to estimate mass emission rates from eight categories of mobile sources which are currently not regulated by national gaseous emission standards. The categories are: 1) locomotives, 2) merchant vessels, 3) power boats, 4) farm equipment, 5) helicopters, 6) snowmobiles, 7) mobile refrigeration units, 8) lawn and garden equipment.

Total hydrocarbon, carbon monoxide, oxides of nitrogen, and, if appropriate, sulfur oxides emissions will be estimated for each category for the base year (1972), and future emission trends predicted to 1990. The analysis will be regional. Each category will be analyzed in an Air Quality Control Region in which that source has a high population and usage. Data relating to source populations, usage, engine operating characteristics, and emission factors will be compiled from census information, government agency statistics, and formal and informal surveys of fleet operators, engine manufacturers, trade and user associations, and source owners.

The project's secondary objective is to design a computer program which will allow the estimation of emissions from any of the source categories in any AQCR in the country.

**R803571-01**

Land application of effluent disposal is receiving strong emphasis as a pollution control method. The problem is to determine the interrelationships between effluent content, climate, soil properties, and growth of agronomic crops to provide efficient operation of effluent irrigation systems, especially under a harsh environment.

Specific objectives are to evaluate; 1) the effects of effluent nutrients on the soil, forage crops, and ground water; 2) production and quality of forage species; 3) mechanical operation of the sprinkler system; 4) labor and electrical power requirements and crop production information required for an economic analysis; 5) design and operation criteria and recommend changes whenever necessary.

Laboratory studies will initially be conducted on reed canarygrass, smooth bromegrass, meadow bromegrass, tall fescue, creeping foxtail, and orchardgrass. Analyses include: in vitro digestibility, protein content, specific mineral content, nitrate content, in vivo nitrate reductase, and soil nutrients. Field studies include: collection of climatic data and its relationship to the performance of the spray disposal system, forage yield of the above six species, harvest scheduling, and observational plots to determine the adaptation of twenty additional forage species.

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R803572 01

The present interdisciplinary study is directed towards the identification and analysis of the elements of an effective decision-making and implementation process concerned with the national goal of improved quality of irrigation return flows. The four areas selected for study are: (1) Yakima Valley, Washington; (2) San Joaquin Valley, California; (3) Grand Valley, Colorado; and (4) Mesilla Valley, New Mexico and El Paso Valley, Texas. The major objectives are: (1) Identify the appropriate technologies and the institutional alternatives that together may improve irrigation return flow quality control; (2) Assess the combinations of technologies and institutions as to the feasibility of implementation in the four selected study areas; (3) Evaluate results obtained in the context of national goals, policies, and objectives aiming towards the improvement of return flow quality; and (4) Analyze the process of technology diffusion and decision-making as the basis for eventual efforts of implementing irrigation return flow quality control.

## R803576-01

This project involves developing a new mapping technique for determining the ground-level concentration profile. It is based on the color change response of acid-base indicators in an aqueous polymer film which is placed on the surface of interest. This approach depends upon the equilibrium absorption/desorption of a gas such as ammonia from the gas phase in contact with the aqueous indicator containing film. The resulting color changes correspond to the average phase concentration at each point on the surface.

Such films will be useful in large scale wind tunnel simulations where a topographical model may be coated and concentration profile maps made for emissions from sources. The film will remain on vertical objects and thus, with long term activity, will be easy to use. Preliminary data indicate that a complete profile for a given set of meteorological conditions can be produced, photographed and the surface regenerated in less than one hour

## R803578 01

Recent investigations have demonstrated that pesticides, in particular the organochlorine pesticides, can alter the hepatic metabolism of male sex hormones in rodents. DDT, dieldrin, and 2,4,5-T have been shown to also affect the uptake of testosterone by its target organs (e.g. prostate glands). Few studies have investigated the effects of pesticide interaction (i.e. more than one pesticide) on the endocrine activity (e.g. uptake and subcellular distribution of male sex hormone) or on hepatic hydroxylation of androgens.

The effect of multiple pesticides on the uptake and subcellular distribution of 3H-testosterone will be studied. Further, the effects of those treatments upon sex accessory gland secretions (e.g. fructose), spermatogenesis, and hepatic hydroxylation of testosterone will be investigated.

The proposed studies will utilize sex accessory organs (prostate and seminal vesicles) of rodents (mice or rats). The incorporation of radioactive androgens into whole sex accessory as well as their subcellular components will be studied following treatment with multiple pesticides (e.g. dieldrin-parathion, parathion-carbaryl, etc.). The actions of these combined treatments will be compared to those effects produced by single pesticide treatment.

R803579 01

Exposed soil material at construction sites of highways, housing areas, and other projects is often subjected to severe erosional attack by raindrop impact and runoff of rainstorms occurring during the construction period. This project is concerned with such eroded sediment, and the specific objective is to find ways or to develop techniques by which this fine material can be effectively and inexpensively removed from the runoff flow. It is proposed to review the literature relating to a number of processes for secondary treatment of sediment-laden effluent from sedimentation basins which have been developed in connection with other applications. Following an evaluation of these various processes, laboratory investigations will be undertaken with the view of developing a pilot model of the most promising device or process for testing in the field at a construction project suitable for the purpose.

R803585 01 0

Exxon Research & Engineering Co. (ER&E Co.) proposes to conduct a program involving a literature search to evaluate liner materials for containment of varuous industrial sludges and liquid wastes. The approach will be to search a broad category of lining materials which have or could be used to contain a variety of industrial sludges and wastes. The specific liner materials included will be grouped into the following categories:

- Flexible Membrane Liners (Cast in place or sprayed on)
- Hard Surface Liners
- Soil Sealants
- Natural Soil Systems

Information will be sought on a variety of chemical and physical properties as well as factors affecting the cost effectiveness of such lining materials.

This work has not been initiated as yet and will be started if a Grant Application currently on file with the EPA is acted upon favorably. It is anticipated this work could start as early as January 1975 and would be completed in six months from the date of initiation.

## R803588 01

The environmental fate of specific chemical species is becoming one of the criteria for evaluation of pollutant impact. Evaluations of the chemical, physical and biological influences to which compounds are subjected are being made in order to describe this impact. In the present context, chemical influences are defined as physiochemical reactions of parent compounds in the environment; physical influences are defined as parameters which transport or disperse chemicals in the environment; and biological influences are defined as physiochemical interactions or metabolism associated with receptor organisms.

Parallel approaches of investigation into the fate of pollutants are being pursued in air or water research yet there is a lack of dialogue between specialists in the two fields. For example, the same diffusion equation models are utilized in air pollution and estuary modeling, and the same coagulation mechanisms are proposed at the salt wedge in an estuary/ and particulate movement in air. The lack of dialogue between investigators may be the reason for the lack of investigation of the movement of pollutants between the air and water phases.

This symposium brings together speakers from different fields of expertise to develop a dialogue on the environmental fates of pollutants. Organic pollutants will be stressed as less knowledge is available concerning interactions of organic pollutants between the air and water environments.

## R803590 01

The proposed work is to conduct a symposium that will bring together all the individuals who participated in the extensive study of the Denver urban plume during November 1973. The major objectives are to (1) provide a productive exchange of knowledge concerning the plume and (2) provide a single source for all the data and conclusions in the form of published proceedings.

R803591 01

Objectives

A detailed search of literature on 38 select pesticides will be carried out to collect all data on their soil fate. Data gathered will give detailed descriptions of the degradative pathways, rates of degradation, leaching characteristics, toxicity of these pesticides and their primary metabolites to man and other wildlife. The collection of this data will allow problem areas to be identified and further research indicated where deemed essential to complete soil degradative pathways for certain pesticides.

Approach

The libraries of the University of Illinois will be utilized. Further, cooperation with individuals within the Federal Environmental Protection Agency will ensure acquisition of data unacessible through the facilities available to the grantees.

R803593 01

The primary objectives of this project is to abet and promote the development of standard analytical and sampling methods in the world through the combined effort of the 69 member countries with a view to facilitate international exchange of scientific data and to develop mutual cooperation in scientific and technological activities.

The International Standards Organization Technical Committee 146, Air Quality (ISO/TC 146) provides the organizational structure.

The development of these standards through the cooperation and combined effort of the member nations will yield a broad view of the many existing methods for analysis or where good methods do not yet exist it will aid in the development.

Scientific experts from the member nations meet, consider and discuss the methods that have been introduced to the committee and then select the method or methods for acceptance by the main ISO/TC 146 Committee.

There are currently four work groups and two study groups active, numerour meetings have been held and large number of methods are under consideration.

ISO/TC 146/WG-1, Total Acid Generating Substances Including Sulfur Dioxide and Oxides of Sulfur; John B. Pate

ISO/TC 146/WG-2, Carbon Monoxide and Carbon Dioxide; Dr. John K. Taylor

ISO/TC 146/WG-3, Oxides of Nitrogen; Dr. Lawrence D. Kornreich (USA Secretariat - John B. Pate)

**R803594 01**

The goals of the project are: 1) to employ a previously developed low pressure impactor to sample aerosol in several geographic locations 2) to extend the size fractionation capabilities of the system and 3) to explore promising techniques for sampling sub-micron aerosols. In particular, the system will be used to collect aerosols for subsequent determination of size distribution and trace element concentration in the Gary, Indiana area, for determination of the size distribution of atmospheric lead in the Champaign, Illinois region and for characterization of the size distribution of sulfur compounds in the St. Louis, Mo. area.

Currently, the system is operated such that it provides a cut-point size of 0.05 μm for particles of density two on the last impaction stage. Work will be done to reduce this lower fractionation size.

R803596 01

The objectives of this research are two: (1) to undertake an analysis of the feasibility, benefits and costs of using building permit data to estimate and project the future demand by user class for water and subsequent investment in supply and distribution networks, and (2) to develop estimates of operating and capital costs, and cost and supply relationships as a function of space and topography, as related to cost/rate differentials among users of the same class and different classes (residential commercial, industrial). This aspect of the research is concerned with estimating the degree of internal cross-subsidies in the system.

The approach utilizes data from building permit applications and water supply records for the Cincinnati Water Work supply area. The analysis will utilize statistical analysis to estimate the relationships and test the appropriate hypotheses.

S80 35[illegible] 01

(1) The objectives of this project are to provide synthetic descriptions and evaluations of numerical techniques of numerical classification (also known as cluster analysis) as they may be used in ecological investigations of water pollution.

(2) The approach encompasses a review and description of the major techniques of classification including similarity measures, data transformation and standardization, clustering strategies. comparisons of normal and inverse analyses, and reallocation procedures. Those techniques particularly efficacious in ecological investigations will be emphasized and the pitfalls of the various techniques pointed out. Examples of application of numerical classification to ecological problems, particularly those related to water pollution, will be provided.

(3) Many classificatory methods have been evaluated and applied by the principal investigator. A series of computer programs for many of these has been developed and is in use.

S80 3602 01

The project objectives are to demonstrate the cost effectiveness of automatic and semi-automatic control schemes available for a number of processes used to treat municipal wastewaters and sludges and to determine for each process the best practical automatic control scheme. The study will involve:

(1) cataloging the process controls currently in use at Metropolitan Sewer Board facilities.
(2) determining the extent to which installed control systems are being utilized.
(3) identifying reasons for underutilization where existing
(4) evaluating new potential control loops in terms of cost, system performance, system reliability.
(5) identifying problems associated with manual and semi-automatic control schemes currently used that may be solved by full automatic control.

All work will be carried out at treatment facilities currently operating and under the constraint that no adverse effects on effluent quality are allowable.

R803603 01

This project proposes to (a) collate and evaluate available information and data on irrigation tailwater production, its quality and reuse potentials, (b) carry out field studies to develop data not now available regarding tailwater flow and salinity and suspended matter in the Sacramento and San Joaquin Valleys of California, (c) determine least cost combination of agricultural production and labor, capital, irrigation water, and tailwater management, and (d) integrate scientific, engineering, and economic appraisals to recommend the best practicable technology for irrigation tailwater management.

R-803607-01

(1) Evaluate existing mathematical models for their ability to describe the simultaneous movement of water and nitrogen species within and below the plant root zone for a twelve month period. (2) Evaluate existing kinetic models for nitrogen transformations using available data and combine these with the transient soil water and solute transport equations. (3) Identify major parameters required to describe nitrogen movement, transformation and removal by the plant as well as gaseous losses to the atmosphere. (4) Consider spatial variability of selected soil physical and chemical properties and their influence on the precision with which nitrogen distribution and movement can be predicted and measured in the field.

Several mathematical models for describing the simultaneous movement of water and interacting and non-interacting solutes in one dimension are currently available. Most of the models are still experimental and have not been used to simulate water and solute movement in the field throughout a growing season. Also, submodels to describe chemical changes in the solute with time and soil depth (e.g. nitrogen transformations) have not been included in many of these simulation models. During the first year of the study, an evaluation of the advantages and disadvantages of existing models for water and solute movement will be conducted. Special attention will be given to efficiency of computer program, accuracy, and number and general availability of parameters required to simulate the movement and distribution of water and solute in the soil profile with time. Through an evaluation of the available basic - and sub-models, a single model for water and nitrogen-movement will be assembled and tested using existing field and laboratory data. Physical models for water and nitrogen movement as well as chemical and biological processes influencing nitrogen behavior will receive major consideration. The solute and water flow equation will be written for both one and two dimensions.

## R803609-01

The current analysis is an attempt to extend and refine Lave and Seskin's intra-SMSA mortality-air quality analysis. The analysis itself will be divided into two parts. The first will be an extension of the Lave and Seskin work to deal with intra-urban mortality differentials for more than 450 census tracts in Allegheny County, Pa. Multiple regression analysis will be utilized in an attempt to isolate ambient air quality's aggravation effect on mortality by controlling for other important factors believed to influence an individual's probability of death. The technique represents a refinement in that relatively more accurate mortality rates (age-sex-race-cause-specific mortality rates based on the period 1968-1972) and air quality readings will be used, and differences in weather and public health systems will be negligible, which is not the case in an inter-SMSA analysis. By approaching the analysis in this manner, clearer insights can be gained into the various air quality shift parameters of the intra-urban mortality functions. These insights will primarily be the result of the use of relatively more accurate micro data.

The second part of this research will involve the estimation of various life tables for the residents of Allegheny County exposed to different levels of air quality. These life tables will be calculated from the mortality functions estimated in phase one of the project. They will enable us to estimate various changes in life expectations, at birth and at specific ages, associated with alterations in ambient air quality.

## R803611-01

The objectives of the project are to develop and/or demonstrate remote sensing techniques for mapping Cladophora using passive multispectral scanner data collected from low aircraft altitudes, and to define the capability of passive multispectral remote sensing for estimating Cladophora biomass.

Remote sensing and supporting field data will be collected during June 1975 over a 5 km. study area along the shoreline of Lake Ontario at a location near Rochester, New York. Processing of multispectral scanner data will include both analog and digital techniques to show the distribution of Cladophora and to relate spectral characteristics to standing crop.

**R803612-01**

(1) OBJECTIVES: (a) to find out how rapidly, how completely, and by what mechanism nitrogen in waste water is converted to atmospheric nitrogen during overland flow over grassed soil surfaces, (b) to determine the mechanisms by which orthophosphate is removed from waste water during overland flow.

(2) APPROACH: Laboratory and growth chamber experiments will be carried out dealing with the mechanisms involved in denitrification losses of nitrogen and soil fixation of orthophosphate during overland flow of wastewater. $^{15}$N and $^{32}$P tracers will be used to distinguish between added nutrients and those in the soil-plant system.

(3) CURRENT PLANS: Wastewater containing labelled nitrogen compounds will be allowed to flow over grass-soil surfaces and the amount of both native and added nitrogen denitrified and returned to the atmosphere, the amount taken up by plants, the amount flowing out of the system, and the amount reacting with the soil will be determined.

**R803613-01**

The Science Information Services Department of The Franklin Institute Research Laboratories will prepare a monthly publication entitled Municipal Technology Bulletin, provide input to the Water Resources Scientific Information Center (WRSIC) Data Service, and prepare camera-ready copy of all abstracted and indexed documents processed to the Project Officer. By continuously surveying the United States' and foreign technical literature and maintaining close liaison with various research organizations in areas of municipal wastewater pollution control, SIS will emphasize the following subject areas: urban runoff and sewers, tunnel technology, patents, treatment methods, analytical techniques, hydrology, and model studies.

## S803614-01

OBJECTIVE: To demonstrate the feasibility and economics of reducing the waste load by [illegible]ydrating and reusing egg breaking wastes as feedstuffs from an egg processing facility a commercial chick hatchery, and a broiler chick hatchery. Demonstration of this in-plant control process will aid in complying with discharge permit limitations established by EPA regional personnel and the egg products inspection act. The latter controls restricted shell eggs and requires that they be denatured or destroyed at the point of segregation to eliminate them from consumer food channels. The project will also provide an alternative to currently used open dumping methods. With the current practices, there exists a great potential for water pollution as a result of rainfall runoff.
APPROACH: (A) Purchase a portable dryer from an equipment manufacturer. Equipment manufacturers indicate a three (3) to six (6) month delay in delivery due to heavy demand. (B) Treat the egg breaking waste from an egg processing, a commercial chick hatchery, and a broiler chick hatchery. Several production units of each specific type are available in Missouri. These have been contacted and arrangements have been made for their cooperation in teh field tests. (C) A minimum of twenty-four (24) determinations, on composite samples, of the undehydrated wastes are to be made and related in terms of pounds of pollutants per unit processed for which further treatment is eliminated. Each sample will be quantified as to its water pollution potential by determining its water soluble BOD. These values will be used to compute the total water pollution potential of each plant. (D) Compute the capital investment and operating cost per unit processed to produce the by-product. (E) Determine the chemical composition of the dried products (protein, fat, calcium, phosphorus, gross energy (bomb calorimeter), and amino acid profile) using composite sampling techniques and a minimum of twenty-four (24) determinations. Determine the processing treatment necessary to produce a salmonella free product. (F) Formulate least cost hen diets to take advantage of each ingredient's chem[illegible]l composition. Design an experimental approach to feed all new products to laying hens.

## S803618-01

The objective of this project is to demonstrate the feasibility, on a full-scale basis, of nitrogen removal in an extended-aeration activated sludge plant. Additional objectives will be to determine design and operating criteria for application of the concept to existing and proposed wastewater treatment facilities in the United States.

The existing wastewater treatment plant at Owego, New York, is proposed for the study because of the wide seasonal range of wastewater temperatures it experiences, and because its design features, current operating conditions, and staff capability are ideally suited to maximize the technical objectives of the study.

S80[illegible]619

1) Objectives: To establish types and volumes of residues generated by environmental control facilities in the steel industry, their management, and their potential application or use, including resource recovery and/or disposal.

2) Approach: (a) Perform literature survey, (b) Plant visits and personal contracts, (c) Establish priorities, (d) Professional organization contacts, (e) Describe existing waste management systems, (f) Prepare a detailed final report identifying and including:
i. The types, quantities and components of wastes;
ii. Existing waste handling and disposal systems;
iii. The severity of the problems associated with the re-use, resource recovery, management and/or final disposal of the wastes and residues, including their effect on surface and ground water pollution, and
iv. Recommendations on research and demonstration projects to be supported in the fields of pollution abatement involving resource recovery, re-use or stabilization and safe disposal of wastes and residues originating from iron and steel-making operations.

3) Current Plans and/or Progress: It is planned to initiate the study by May 1, 1975. The project will be headed by a director who will receive guidance from an advisory group composed of senior engineers and management staff. The information collected and identified in the approach category will be systematically organized, evaluated and properly reported quarterly.

R803620 01

(1) Objectives: To select and optimize a polybenzimidazole reverse osmosis membrane system for chrome rinse bath treatment and to tailor it to the specific application.

(2) Approach: A laboratory study of membrane optimization and performance characterization will be carried out. Flat sheet membranes will be prepared. Membrane preparation variables, including film casting conditions, coagulation variables and annealing conditions will be investigated to obtain optimum membrane properties for rinse bath solutions containing chromic acid at realistic concentrations. Product water flux and solute rejection will be determined on membrane variants.

(3) Current Plans and/or Progress: Materials and equipment for a high-pressure test flow loop are being assembled. Analytical test methods are being studied.

R803623-01

The objective of this research is to analyze and compare the costs and effectiveness of conventional advanced waste water treatment systems with the costs and effectiveness of aquaculture waste water treatment systems with respect to small communities. Cost/Effectiveness methodology is employed in an attempt to determine the economic feasibility of aquaculture systems as alternative waste management techniques.

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S-803627-01-0

## PROJECT DESCRIPTION

### Objectives

The overall objective of the project would be to show that a full-scale anaerobic filter will treat young leachate from a landfill. In achieving this objective, the following subset of objectives will be attained:

1. Develop, conduct, and report on bench-scale testing, rational procedures, and results.
2. Develop and report design rational, procedures, and calculations.
3. Construct the treatment system, reporting procedures, problems, and problem resolution.
4. Evaluate the system, reporting on operating and maintenance procedures, and problems and system performance.

The reports will be developed with the objective of providing guidance to other communities contemplating building a leachate treatment plant.

### Summary

The project would be phased as follows:

I. Preliminary Analyses - Leachate samples would be collected and analyzed.
II. Bench-Scale Testing - A bench-scale anaerobic filter test would be conducted using leachate from the site.
III. Hydrogeologic Study of Site - The hydrogeology and soils of the site would be analyzed and described, providing an assessment of leachate flow rates on which to base system design. A leachate collection system will be designed in this phase based on results of the hydrogeological study.

## R803631-01

Reliable and accurate discrimination of free aqueous chlorine (HOCl and $OCl^-$) from combined active chlorine (m N-chloro compounds) is required for optimal disinfection water supplies, especially when viral inactivation is important. Test methods have been developed to distinguish free chlorine from ammonia chloramines, but there is doubt as to the validity of these methods in the presence of organic N-chloro compounds This study will attempt to determine significant forms and concentrations of nitrogenous organic matter in common raw water sources, will investigate the reactions of these substances with aqueous chlorine and will evaluate the interference of the chlorinated products with analytical methods for selective determination of free chlorine.

Studies on the chlorination reactions of model compounds likely to be found in natural waters such as pyrrole, indole, typical pyrimidines and purines, and selected amino acids will be undertaken with ultraviolet spectroscopy as the tool during the period when isolation and characterization of nitrogenous organic compounds by various chromatographic techniques is proceeding. When identification has been achieved, studies on the chlorination of the discovered compounds will be substituted.

## R803632-01

This is a proposal for a one-year period to perform analyses relating to pollution control strategies based on modeling considerations. We want to compare various abatement strategies (roll back, maximum control, least-cost, etc.) and evaluate their consequences. Statistical theory, such as the theory of experimental design and time series analysis, will be used in order to explore optimal ways of extracting information from the data base. An important task will be to remove unnecessary complexity in the air quality models. In the spirit of the repromodels one might approximate the air quality distributions with piecewise linear functions or even consider higher-order splines or alternatively, finite-element methods.

The analysis is to be carried out in four main phases:

I. The sources of pollutants are divided into n groups each of which may be regulated independently. Using an atmospheric diffusion model we calculate for each group r a transfer function $u_r$ relating its source-strength to its concentration contribution at each point of a grid covering the air control region. II. A continuous piecewise linear function is fitted to each $u_r$, reducing the impact of local aberrations due to stochastic errors in the data base. III. Selection of a reduction policy (e.g., roll back, maximum control, least-cost). IV. Validation of the model by comparison of calculated values with measurements.

The research plans include full-time support for Gustafson during two months and full-time support for one graduate student assistant during the entire year. Cost sharing will be provided by the Environmental Studies Institute of Carnegie-Mellon University.

R803636 01

The objective is to design a process and related methods for planning environmental quality management systems and related land use and transportation systems in regions that are under significant pressures of urbanization. Particular attention will be given to interrelationships amony provisions of the Clean Air Act, the Water Pollution Control Act, the Federal Highway Act, the National Environmental Policy Act, and guidelines related to these acts, but these acts will neither completely determined the scope of the project nor be taken as constraints for design of the planning process.

The problem will be approached by first developing parallel working papers in land use, transportation, and environmental quality which set forth the present legislative and organizational frameworks, planning and management processes, and mechanisms for coordination and integration. Failures and weaknesses in the existing frameworks and processes will be identified; major policy issues that must be addressed by any proposed solutions will be identified also. With the problems thus identified alternative models for planning and management of environmental quality that capture the most significant relationships among the three sectors will be developed within the multiple-objective rational planning theory and alternative organizational arrangements.

Alternatives will be adapted to and tested in the policy-organizational environment of four metropolitan areas in the U.S.

R803637-01

The principal objective of this project is the development of reliable techniques consistent with the basic simplicity of lagoon operation for removing phosphorus and unoxidized nitrogen from lagoon effluents. Two in-cell injection points will be evaluated to determine the potential of alum addition for efficiently removing phosphorus from wastewater being processed in a three-cell combined aerated/facultative lagoon. A sidestream of effluent from the last cell of this test lagoon will be diverted through a plastic-media trickling filter tower to evaluate the potential for achieving consistent nitrification with this type of second stage biological treatment.

The secondary objective is the acquisition of reliable long-term data from well designed and well operated three-cell combined aerated/facultative lagoon not receiving alum addition which will be operated in parallel with the test system and serve as a control. Assessment of the effect of alum addition, not only on phosphorus removal, but also on suspended solids and organic removals and determination of additional costs and operating requirements necessitated by the nutrient control procedures are additional objectives.

R803643-01

The primary objective of the proposed research is to apply a serologic-epidemiologic methodology for appraising the health effects of human exposure to municipal wastewaters. The approach is to conduct a three-year prospective epidemiologic study of persons exposed on an occupational basis to wastewaters, namely, sewer maintenance workers. The study population will include workers newly engaged in sewer employment, workers with several years of sewer employment, and a control group.

The protocol involves: periodic immunologic, virologic and bacteriologic examinations of sera, urine, pharyngeal swabs and stool; yearly multi-phasic physical examinations; health diaries; evaluation of sickness and absenteeism reports; work observations; and selected follow-up of worker families. The results will be statistically correlated.

The proposed research will also assess the sensitivity of this epidemiologic-serologic approach to a determination of the human health risks of other exposures to wastewater discharges such as: recreational use of waters receiving waste effluents; living near wastewater, disposal facilities, and living near or working near sites of the land application of wastewaters.

S803644-01

The objective of this program is to demonstrate on a small plant scale that the Barber-Colman PURETEC System is a cost effective method of ultimate sludge disposal. The project involves the installation of a 16-dry ton/day sludge disposal system to treat digester sludge. The installed plant will be operated eighteen months to provide complete detailed information on process efficacy, operating and maintenance costs, equipment reliability and recovery of non-renewable natural resources.

R803645-01

The objectives of this work are to determine health effects data and to prepare a criteria document recommending a drinking water standard for molybdenum if the data suggests a need for such a standard. Molybdenum is an element which is a micronutrient for plants and animals in that it plays a crucial role in some flavoenzymes. At sufficiently high rates of intake molybdenum is toxic to organisms; ruminants are much more sensitive than nonruminants.

The Rocky Mountain states produce essentially all of the U.S. molybdenum. Much of this product is processed and used in the eastern U.S. The occurrence of significantly elevated levels of molybdenum in drinking water due to industrial sources has been documented and STORET data indicates that this occurrence is not confined to the Rocky Mountain region.

The specific objectives of the program are to answer the following questions: 1) How much Mo are humans receiving in their total diet? 2) Does the biological activity of Mo in food differ from that in water? 3) How much Mo is accumulated and what are the tissue levels in humans on normal and elevated intakes? 4) Are there any detectable effects of elevated Mo intakes at the various animal levels of organization? 5) What is the level of Mo intake in water that causes no detectable effect?

The work will consist of studies of both laboratory animals and human volunteers and will consist of: 1) uptake and excretion in rats and humans; 2) tissue levels in rats and humans exposed to low and high levels of Mo in their diet; 3) absorption of Mo in rats and humans; 4) effects of various animal levels of organization in rats and humans of elevated Mo intake; and 5) a major conference on Molybdenum in the Environment.

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R803651 01

Research in several related areas of chemical ionization mass spectrometry will be conducted: (1) Development of trace quantitative analytical techniques for the determination of mixtures of lanthanides as their volatile chelates using a chemical ionization mass spectrometer; (2) Studies of anion chemical ionization mass spectra of the lanthanide chelates; (3) Studies of novel gas phase ion-molecule reactions occurring in a chemical ionization source; and (4) Analysis of particulate emissions from combustion sources.

R803652 01

The proposed research involves the measurement of gas production rates and leachate composition to measure refuse stabilization under anaerobic conditions. The refuse has different steady state and transient moisture conditions to simulate actual landfill conditions. Optimum moisture conditions will be determined for the acid and methane fermentation phase during the refuse stabilization. These conditions can then be selected by enforcement agencies to create the most desirable environmental impact of the solid waste on the environment.

R803653 01

Vanadia and iron-oxide chromium oxide catalysts have been shown, in a recent study conducted by UCLA for EPA, to be highly active for the reduction of nitric oxide with ammonia in the presence of oxygen and sulfur dioxide. The initial studies revealed that this catalytic approach to $NO_x$ abatement holds considerable promise for application to coal-fired power plants.

A twelve-month project is proposed to further characterize the performance of these active, non-noble metal catalysts at the bench-scale level of operation. The overall objective of the project is to provide necessary data for scale-up to the next level of equipment size.

Initial effort in the program will involve optimization of catalyst composition and development of preparation specifications. Parametric studies of process variables and stream compositions will be made to develop rate expressions for design use. Long duration durability tests will be conducted with the $V_2O_5$ and Fe-Cr catalysts both in the presence and absence of flyash and at various levels of $SO_2$ concentration.

Analyses will be made of the effluent stream to identify possible secondary, toxic gaseous emissions as well as those species directly under kinetic study. Metal and sulfate analyses of the particulates evolved will also be made.

## R803656 01

1. Objective - The objective of the proposed project is to demonstrate a physical/chemical/biological treatment process capable of treating on a reasonably economic basis, wastewaters generated in a truck tanker washing facility.

2. Approach - The proposed project will entail the construction and operation of a full scale demonstration wastewater treatment facility at the Swedesboro, New Jersey truck washing terminal of Matlack, Incorporated.

3. Progress - A pilot scale physical/chemical/treatment system utilizing activated carbon was operated to determine the feasibility of the project.

## R803659 01

A. Project Objectives. The primary aims of this project are twofold:
   1. The evaluation of the applicability of a new group of bacteria, the Viridans streptococci: Streptococcus mitis and Streptococcus salivarius as superior index organisms of human fecal pollution in water; and
   2. The utilization of a qualitative and quantitative fluorescent antibody (FA) technique for the rapid and specific detection and enumeration of these bacteria.

B. Project Approach. In keeping with the objectives of this study, the experimental design of the project will encompass a three-phase approach:
   1. A study of the qualitative and quantitative presence and distribution of members of the Viridans streptococci group in stool specimens of human versus other warm-blooded animals and environmental samples;
   2. A study of the in vitro die-off rates of the Viridans streptococci in both pure and mixed cultures with other index organisms, as well as major fecal, skin, and nasopharyngeal pathogens;
   3. Development and evaluation of the fluorescent antibody (FA) techniques --both slide and membrane filter FA (MFFA)--for the specific, rapid detection of these organisms in various types of surface waters.

C. Current Progess. Considerable preliminary data has been accumulated on each of the above listed phases of the project. All of the data to date points to the feasibility of the premis of this project, i.e., the use of the Viridans streptococci and FA for rapid, specific detection of human pollution in water.

## R803660-01

Objective of study is the correlation of observations of aerosol size distributions in the atmosphere and in smog chambers with the theory of aerosol dynamics through mathematical descriptions and numerical simulation of the basic growth processes of particulate matter. Currently, accurate numerical simulation has been achieved for aerosols growing by simultaneous nucleation, coagulation, and condensation. Further work on coupling these growth processes to chemical species undergoing reaction is planned.

## R803662 01

Disposal of animal wastes on the land with production of food and fiber may turn a waste into a resource. However, animal wastes contain salts and chemicals which can pollute runoff waters and affect the soil at the disposal site.

The objectives of the proposed work are:

1. Evaluate the effects of roughage content and salt content of the ration upon amount and composition of wastes from beef cattle in confined feedlots.
2. Evaluate the influence of covered versus open pens upon the chemical and physical properties of wastes to be removed from the pens.
3. Determine the maximum application rates for disposal of wastes on the land compatible with maintaining reasonable levels of crop production with pollution control.
4. Determine the concentration and movement of chemical and bacteriological waste components of surface runoff or leaching through the soil under the prevailing climatic conditions.

The results will be used to formulate guidelines for disposal of wastes on the land while producing a crop with a minimum of water pollution.

R803663 01

The objectives of this symposium are three-fold: 1) to circulate, discuss and interrelate new information on gas and leachate formation, collection and treatment; 2) to promote discussion between research personnel from various parts of this and other countries; 3) the production of a report on the state of the art.

A Research Symposium will be held at Cook College, Rutgers, the State University, by the Department of Environmental Science in March 1974. Attendees will be contacted by mail in the northeastern United States and speakers will be drawn as described in the attached proposal.

R803664 01

More than 47 million tons of recoverable cellulose are annually discarded in municipal waste in our country. Conversion of this waste cellulose into glucose as a precusor for the manufacture of chemicals or proteins will help alleviate our growing petrochemical and food shortages. The goal of this research is to investigate chemical and physical pretreatments of waste cellulose for optimizing the continuous production of glucose via the acid hydrolysis process.

## R803665 01

**Objectives**

To enhance water management in the textile slashing and desizing processes through developments of solvent slashing and desizing techniques and to evaluate the environmental and economic impact of solvent technology as it applies to warp sizing.

**Approach**

Materials and methods for solvent sizing and desizing will be evaluated. Performance of solvent sized yarns will be compared to that of aqueous sized yarns. Economic and environmental evaluations of the results of the work will be made.

**Current Plans**

Characterization of potentially applicable polymer materials will be made. The course of further work will depend on the results obtained in this initial phase of the project.

## R803666 01

A study is proposed for the research, development and standardization of baculovirus identification techniques to be utilized for detailed studies to elucidate, more definitively, biological interactions and fate of viruses in non-host systems. This will involve a careful biochemical and biophysical study carefully correlated with the capability of selected serological techniques to monitor any biological activity of the virus desirable to detect. From this should evolve standardized procedures and reagents for in vitro and in vivo detection of ;suspect systems for virus, personnel monitoring, and/or evaluation of quality control during mass production of virus for applied uses. More importantly, the potential for infection of a non-target organism can be evaluated in specific terms of detectable viable and non-viable interactions, and thereby more accurately judged in terms of potential biohazard in both short- and long-term application. Such information will be necessary for the ratification of the expanded use and application of a baculovirus or baculovirus/chemical pesticide combination in the environment for arthropod control: an application which shows condiderable promise and potential.

R803671 01

The objectives of the program are to delineate the large-scale movement of water masses in Southern Lake Huron and the Western Basin of Lake Erie through an analysis of ERTS-1 (Earth Resources Technology Satellite Data). The intent is to process and utilize ERTS data together with data collected by conventional sampling and analytical procedures for purposes of defining the movement of pollutants including the trans-boundary movement. The program is sponsored by the Large Lakes Program, U.S. Environmental Protection Agency and is a contribution to the joint U.S.-Canadian program in Lakes Huron and Erie.

R803673 01

The project will define the effects of nutrient removal by advanced wastewater treatment on the fishery resources of Shagawa Lake, Ely, Minnesota. Changes in abundance of forage species and feeding, growth, abundance and distribution of *Stizostedion vitreum vitreum* (Mitchill), *Coregonus artedii* Lusueur, *Esox lucius* L. and *Catastomus commersoni* Lecepede, are being measured. Because changes in nutrient levels may be expected to influence fish production through effects on food availability, feeding studies are emphasized and include measurement of changes in feeding rates and diel periodicity in *S. vitreum v.*

Infestation of *C. artedii* with *Triaenophorus crassus*, is being studied. Changes in abundance of plankton essential to the life history of *T. crassus*, are expected to result from changes in trophic conditions which would increase survival and infestation levels.

R803667 01

International Paper Company proposes in-plant tests of hyperfiltration and ultrafiltration techniques, utilizing dynamic membranes, applied to effluents from the kraft process. The basis for these techniques is the prior work conducted by the Water Research Program of the Oak Ridge National Laboratory. IP Co. Proposes to sub-contract for support from ORNL.

In a cooperative program under the ORNL-NSF Environmental Program, laboratory tests have indicated good prospects for early usefulness of these techniques in ameliorating several problems of the kraft process. One is the concentration of effluent from pulp washing by hyperfiltration. Another is removal of color and organic matter from the caustic solution generated in the bleaching process by ultrafiltration. In the first application savings of heat, water and chemicals appear likely to balance the cost of hyperfiltration, without allowance of credit for environmental benefits. Treatment of the bleach plant effluent appears considerably cheaper than any of the leading present alternatives.

The unit proposed will be of about 1000 gpd capacity, and will be tested at the IP Co. mill at Mobile, Alabama. Objectives are to confirm laboratory tests under field conditions, and to accumulate information necessary to estimate costs and to guide scale-up to industrial size.

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R803688-01

The purposes of this project are to explore in some depth, the consequences of various proposed water quality control actions for Lake Ontario and begin the development of a eutrophication model for Lake Michigan. The long and short term effects on such indicators as phytoplankton biomass, nitrogen and phosphorus at key locations throughout the lake will be examined. More specifically, the key overall purpose of the investigation is to delineate the relative impact on Lake Ontario of the man made point sources of municipal and industrial wastes, the upstream input from Lake Erie (representing the effects of the upper Great Lakes) and the input from both point sources and uncontrolled runoff in tributary sub-basins. By evaluating the relative impact of each of these major categories of impact to Lake Ontario, a firmer base can be established for water quality planning and waste load reduction.

Similarly, the first stage in model development for Lake Michigan will ultimately provide a means for estimating the long term response of the Lake to nutrient control and then in turn the expected output from the Lake and the subsequent effect on the lower lakes.

## R803682 01

The eddy exchange coefficients and their variations with height in the planetary boundary layer are to be estimated for urban and rural locations. The basic approach is to relate vertical flux determined directly from aircraft measurements to the vertical gradients determined from sounding data.

Field measurements are to be made in the St. Louis area in February and July 1975. The basic aircraft measurements of the three components of air velocity, temperature and moisture content will be made with fast-response instruments and recorded at a high sampling rate. Wind profiles at six strategically located sites will be obtained using double theodolite tracking of pilot balloons. Balloons will be launched simultaneously from all sites at 10 to 20 minute intervals. Flight tracks will pass over these wind sites.

Operations are to be coordinated with other research programs being carried out in St. Louis under EPA/RAPS and METROMEX.

## S803683-01

Description of the Program - The program involves establishing a multi-material source separation system in an urban area, Somerville, Massachusetts:

- Weekly curbside collection of flat paper and mixed cans and glass; and
- Use of a compartmentalized collection vehicle

Program elements include: 1) Feasibility analysis (already completed); 2) Program design; 3) Implementation; and 4) Evaluation and documentation.

Objectives - The objectives of this program are as follows:

- To demonstrate and evaluate a multi-materials source separation program in an urban area.
- To document the demonstration and facilitate information transfer to other communities across the country.

In accomplishing the objectives outlined above, the program will demonstrate alternative source separation techniques, collection methods using a compartmentalized vehicle, and innovative methods of developing public participation in the program. It is anticipated that the results of this demonstration program will be of considerable benefit to other municipalities across the country, and that the techniques developed can be directly transferred to other source separation programs.

R803684-01

The objective of the project is to collect and maintain all past, current and future data, studies, and plans pertinent to water quality hydrology of the oil shale regions in Colorado, Utah, and Wyoming as affected by oil shale development. These data will be summarized and partially analyzed and interpreted for use by federal, state, and private decision-making bodies. In addition, a mathematical model, currently under development for use in coal strip mine studies, will be modified and tested for use in the prediction of the quantity and quality of surface and subsurface runoff from processed shale residues and oil shale mine spoils.

R-803685-01-0

(1) Objectives: The first objective of this proposal is to investigate the atmospheric residence time of various anthropogenic pollutants as a function of removal processes and long-range transport processes. Both processes will be treated as functions of geographic position and time, with special emphasis on seasonal differences. The second objective is to determine the most probable sink areas for pollutants emanating from specific source regions.

(2) Approach: These objectives will be accomplished by the following studies:

- i) Estimates of the amount of pollutants from specific source regions made available for long-range transport processes.
- ii) Development of trajectory techniques which will describe adequately the movement of pollutants released into the free atmosphere by the diurnal variation of the depth of the planetary boundary layer.
- iii) Development of a statistical approach which combines the advective transport of pollutants in the free atmosphere with dry and wet removal processes as a function of geographical location and season.

(3) Current Plan: Since the present proposal involves several complex problems, it is anticipated that at least two years are required to accomplish our goals. The first year will be spent on the development and refinement of techniques for the calculation of long-range transport processes. The second year will be spent on estimation of residence times of pollutants in the atmosphere and on the determination of sink areas.

R803686-01

It is proposed to study the water temperature dynamics in the experimental channels of the Monticello Field Station in order to assist in the design of water temperature measuring systems, the operation of the facility and the interpretation of the water temperature data collected with reference to channel flow characteristics and weather conditions.

Field measurements and an analytical model will be used to provide the information required.

R803689-01

See attachment

S803690-01

(1) OBJECTIVES: The Cherne Thermal Rotor is a spray cooling device that has been tested on a small scale. The proposed work involves the testing of twelve (12) Cherne Thermal Rotor Modules. This size test will allow for the determination of environmental effects that can be expected in large power plant installations. The specific environmental effects that are to be determined are as follows:

A. Plume Definition - The plume of modified air that results downwind of the spray cooling system will be analyzed and mapped.
B. Drift Characterization & Transport - Drift, which consists of water droplets that are blowing downwind of the spray system will be caught, measured and defined as a function of downwind distance and wind velocity.
C. Thermodynamic Information - This test will also be used to determine the effect on the thermodynamic performance of a cooling system when a large number of modules are tested together.

(2) APPROACH: The approach to this testing is to install twelve (12) Cherne Thermal Rotor Modules in a power plant location where hot water is available and proceed to run tests during both the hot part of the year and the cold part of the year. A complete set of instrumentation will be provided to measure the ambient conditions of the air before and after it has passed through the spray system.

(3) CURRENT PLANS: At the present time, the test has not started and it is estimated that it will start during 1975.

## R803692-01

Objectives-The objective of this research is to study the interface problems associated with extractive sampling and measurement of particulate pollutants in hot stack gases.

Approach-First, a careful review (or study) and theoretical analysis of known or suspected problem areas will be undertaken. The more important problem causing areas will be selected and studied experimentally in order to define or understand the causes. Solutions to or ways to avoid or minimize these problems will then be found and described.

Current Plans-This project is in the proposal stage and will begin as soon as funded.

## R803694-01

The Third International Estuarine Research Conference will be held in Galveston, Texas, October 7-9, 1975. The Conference will present invited papers only, centered around a theme of "estuarine processes." Session themes scheduled are: Energy Flow and Material Cycling, The Role of Man in Estuarine Processes, Population Dynamics, Uses of Wetlands Marsh-Estuary Interactions, Estuarine Animal Behavior, Rehabilitation of Estuaries, Recent Advances in the Tools by which Estuarine Data is Accumulated, Sedimentary Processes and Finite Difference Dynamic Models.

R803699 01 0

Purpose: The broad objectives of this third International Symposium on Livestock Wastes are to bring together scientists, engineers, educators, public officials, industry representatives and livestock men to discuss the application of technology, guidelines for design and to make recommendations for future livestock waste management systems.

Procedure: The American Society of Agricultural Engineers initiated International Symposium on Livestock Wastes-75 and enlisted the cooperation of 18 professional societies, industrial organizations and Federal agencies who are directly involved with livestock waste management. The first ASAE symposium on animal waste management was held in 1966 at Michigan State University. The second followed in 1971 at Ohio State University. This symposium, to evaluate livestock waste management systems and to chart a course for the future, will be held at the University of Illinois, Urbana-Champaign, Illinois April 21-24, 1975.

Everyone who is or intends to become professionally involved in areas related to livestock waste management, environmental sciences, agriculture and engineering, including extension engineers, educators, public or industry officials have been invited to participate and/or present a paper. A program committee including representatives of all the cooperating societies, organizations and agencies has selected 180 papers from 250 submitted titles to develop a program consisting of 3 general sessions and 31 central theme sessions. The program papers will report the latest research results and will report evaluations of on-farm installations of specific waste management systems. The program papers will be published by ASAE in a Conference Proceedings.

A livestock waste management equipment show will have over 50 exhibits and will include both indoor and outdoor exhibits and field demonstrations. The show has been set up on an exhibit fee basis and no costs of this exhibition are included in the budget for the Symposium program.

R803701 01

The ultimate aim of the work being conducted on actinomycetes in wastewater treatment plants is to control the growth of actinomycetes in activated sludge mixed liquor, and to prevent the formation of actinomycetic foams in a-l types of activated sludge plants. The work planned for this grant period will try to prove that the addition of anaerobic digester supernatant to the aeration tanks can control the growth of actinomycetes and the resultant foaming in full scale operational activated sludge plants.

Three waste treatment plants will be operated for a period of time with little or no anerobic digester supernatnat return to the systems. It is envisioned that the foaming problem will develop. Digester supernatant will then be added to the systems at a predetermined rate. Samples will be analyzed in the laboratory for types and quantity of actinomycetes in the foams and the activated sludges. The waste treatment efficiencies and operating parameters of the plants will also be monitored in order to study the effect of the addition of the digester supernatant on the treatment process.

## R803702 01

Prior work has shown that use of a heterogeneous catalyst markedly enhances the rate of oxidation of organics in aqueous solution and allows essentially complete removal of organics present, and that aqueous-phase catalytic oxidation is economically competitive with other physical-chemical wastewater treatment techniques for medium and high organic concentrations. The principal objective of this work is to demonstrate the practical applicability of aqueous-phase catalytic oxidation for the removal of organics in industrial wastewater streams. Associated objectives are to evaluate catalyst durability and resistance to poisoning under projected operating conditions; to develop catalysts which have desired properties of durability, poison resistance and activity; to identify catalyst poisons; and to demonstrate range of applicability of aqueous-phase catalytic oxidation. Long term studies of the catalytic oxidation of organics in four different industrial wastewaters will be carried out in a small plug-flow reactor at temperatures from 150-220°C. Several typical catalysts and several unique catalysts will be investigated for required activity, durability and poison resistance.

## R803703 01

### OBJECTIVES

(1) To assess the potential of the aquaculture method of wastewater treatment as a suitable means of treating municipal sewage waters in a mid-temperate latitude on an annual basis.

(2) To provide a set of design criteria for implementation of the aquaculture wastewater treatment method.

(3) To achieve an effluent quality amenable to P.L. 92-500 and the 1977, 1983, and 1985 standards.

### APPROACH

To evaluate differences between series operation of conventional lagoon treatment and an aquaculture system. Fish growth/unit time will be compared to effluent quality and certain ecological water parameters to determine the contribution of nutrient binding by the animals. Effluent quality of the conventional retention series will be compared to effluent quality of the aquaculture series.

### PROGRESS

Studies conducted during the years 1971 - 1973 indicate high effluent quality may be obtained through fish culture operation in a series of conventional lagoons. The design and approach of the proposed project are patterned after this pilot study.

R803704 01

The project is directed towards the problem of the dispersion and fate of hazardous materials in large lakes and will emphasize the dispersion and fate of materials in the near-shore and near-bottom aquatic and sedimentary environments. The project will (1) conduct a general but idealized study of the dispersion and fate of hazardous materials in the near-shore environment, including mathematical modeling, and (2) apply these general studies to a specific hazardous material and a specific site, including validation of the mathematical model by comparison with field observations at this site. A major part of the project is an investigation of the exchange processes occurring at the sediment-water interface, an important but not well understood component of the mathematical model. This part of the project will involve field and laboratory work.

R803705-01

The two main objectives of this proposal are (1) the direct assessment of the relative toxicity of combustion products of 4 different diesel fuels as emitted from a diesel engine and diluted and cooled to gas concentrations and temperatures compatible with biological test systems; and (2) the measurement of the relative biochemical toxicity of 6 or 7 chemically separable fractions from the collected combustion products of one of the fuels.

A secondary objective is to utilize and compare the biochemical alterations resulting when *in vitro* cell culture systems of human, baboon, and rodent blood and lung origin are directly exposed and utilized as the biological test system.

The biochemical indices to be used upon exposure of baboon macrophages include macrophage migration and response to MIF, phagocytic ability, aryl hydrocarbon hydroxylase (AHH) activity, ATP concentration, and RNA precursor incorporation rate. Upon exposure of other cell types, the following parameters will be measured; collagen synthesis in WI-38 cells, response of baboon lymphocytes to mitogens, RNA and DNA precursor incorporation rates, AHH activity and inducibility, proliferative capacity, viability, and colony forming ability.

For each cell type, the induction of repair replication, indicative of damage to the cell DNA, will be measured.

R803706-01

Previous and presently funded research by the Principal Investigator has demonstrated important relationships between abundance of larval fishes, the concentration of their food and both growth and survival. This proposal seeks to expand this research to include larvae of two additional species that are common in Biscayne Bay, the spotted seatrout and the lined sole. Optimal densities of stock and food will be determined under standardized culture techniques. Results will contribute to baseline knowledge for culturing larvae of marine fishes. Such knowledge will be necessary to help evaluate effects of toxicants and pollutants on larval growth and survival.

Embryos of seatrout are obtained by artificially fertilizing eggs from females that are induced to spawn by injections of human chorionic gonadotropin. Lined sole embryos can be collected in plankton nets, but an attempt to induce ovulation in females by hormone injection also will be made. Pelagic larvae of both species can be reared using standard techniques developed by the Principal Investigator. A comparison of zooplankton and cultured rotifers as larval food will be included in the study. Combinations of embryo stocking density and food concentrations will be tested; growth, survival and yield will be compared at 16 days after hatching, when experiments will terminate. Results will add to knowledge of factors affecting laboratory growth and survival of several species of Biscayne Bay fish larvae that differ greatly in morphology and behavior, thus allowing development of some general concepts about the role of density dependent factors during their early life stages.

R803713 01

The objective of this project is to evaluate existing ground-water simulation models in terms of their utilization in predicting the movement and quality of ground water. The work will involve a referee system using common data, format, and output requirements. The completed report of this work will suggest areas of future research and will serve as the technical component to proper management of subsurface water resources.

## R803714 01

(1) Objectives: Determine the fate and biological effects of low levels of cadmium input to complex flowing water systems.

(2) Approach: Cadmium chloride will be introduced continuously into four of six 300 foot long artificial stream systems for a 1 year period. Levels established will be 2 ppb in two channels and 10 ppb in the other two. Samples of water, sediment, channel liner, biota, export, and air will be taken on a periodic basis for cadmium analyses. The structure and function of the benthic and periphyton communities will be determined by detailed species counts and productivity determinations. Sampling will continue for an 8 month period after cadmium inputs are stopped.

## R803715 01

The objectives of this project are to pursue results obtained in a previous grant that showed that fuel sulfur inhibited nitrogen oxide emissions resulting from atmospheric fixation. Specifically it is planned to determine whether fuel desulfurization will have an adverse effect on nitrogen oxide emissions, and to determine the chemical and physical processes involved in sulfur oxide and nitrogen oxide interactions on combustion processes. In addition, general scale-up procedures will be developed, that allow small scale laboratory data to be extrapolated to real combustion systems. The approach will involve pilot furnace tests on oil and coal firing, laboratory experiments using well defined premixed and diffusion flames and theoretical modeling. Thus it is hoped not only to investigate the existance of an effect, but also to gain insight into how and why such an effect exists.

## R803716 01

The object of the research is to provide a definitive state-of-the-art report concerning the technical and economic feasibility of utilizing reverse osmosis (RO) based techniques in the treatment of both ferrous and ferric acid mine drainage originating in coal mining operations.

Information will be gathered from the work of previous investigators, treatment plant operating experiences, industrial producers of RO and other acid mine drainage treatment equipment, and RO process synthesis research to be conducted by the WVU investigators at the EPA Crown Mine Drainage Control Field Site (Crown, WV). Studies to be performed at Crown consist of lime, soda ash, and lime-soda ash neutrolosis utilizing a 60,000 gallon per day RO unit. Also included will be investigations of two stage RO processing using both 60,000 and 4,000 gallon per day RO units, coupled ion exchange-RO processes, and lime-soda softening of acid mine drainage as a pretreatment step to RO processing. All data from these studies will be factored into the report as required to present a complete accounting of RO process potential for AMD treatment.

## R803717 01

A laboratory investigation is being proposed to examine the effectiveness of fly ash, bottom ash, Ottawa sand, activated carbon, illite, kaolinite, vermiculite, natural zeolites and activated alumina as absorbents for removing the hazardous and toxic materials in the leachate and liquid portion of the waste originating from petroleum refining sludge, metal finishing sludge and calcium fluoride sludge from the electronics and air-craft industries.

These results of this study will provide information and recommendations for the use of such absorbents in landfill operations for the safe disposal of hazardous and toxic sludges indicated above.

## R803719 01

The objective is to critically examine the basis for the indirect measurement of particulate matter mass concentration by the use of contact electricity as the detection mechanism. A study of the literature has been made and a contact-electricity type of monitoring instrument has been tested in the laboratory. The total charge has been found to correlate well with gravimetric mass. The response of the instrument depends mainly on the electrical resistivity of the material. The condition of the surface of the probe has a major effect on the sensitivity. Further tests will be made to investigate the effect on the instrument performance of the condition of the probe surface, particle size, and other relevant parameters.

R803722 01

The objective of this research effort is to establish the final form of the technical algorithms contained in the Pesticide and Nutrient Transport and Runoff (PTR-Nutrients) Model, developed by Hydrocomp and the EPA Southeast Environmental Research Laboratory in Athens, Georgia. These algorithms represent the mechanisms of surface runoff, sediment loss, pesticide-soil interaction, pesticide attenuation and plant nutrient behavior within the soil profile. They will be 'final' only in the sense that they will reflect our current understanding of the specific mechanisms; future research and advancement of the state-of-the-art will require modification and refinement. Data from the Piedmont and Great Lakes test watersheds will provide the basis for final testing and refinement of the Model algorithms prior to release of the PTR-Nutrients Model to public users. This research effort will help to provide (1) a better understanding of the basic transport modes of non-point source pollutants (sediment, pesticides, nutrients, etc.) and (2) progress in the ultimate development of a tool for regulation and control of such pollutants.

S803724 01

Sediment and erosion control techniques will be demonstrated on land pertubated by installation of a golf course in Fairfield County, S. C. Effectiveness of each sediment control measure will be monitored. A cost-benefit analysis will be performed for each sediment and erosion control technique and guidelines, applicable to the Southeast piedmont will be established.

R803726 01

The overall objective of this research effort is to develop a model capable of simulating the transport and runoff of agricultural chemicals from relatively large stream basins. Such basins are distinguished by the contribution of all components of streamflow (surface runoff, interflow, groundwater flow), whereas smaller watersheds provide only the surface runoff and interflow components.

The intent is to expand the scope of the Pesticide and Nutrient Transport and Runoff (PTR Nutrients) Model developed by Hydrocomp and the EPA Southeast Environmental Research Laboratory (SERL), in Athens, Georgia. The PTR Nutrients Model simulates the movement by hydrologic mechanisms of pesticides and nutrients on small watersheds. Numerous complex mechanisms determine whether or not pollutants washed off these small watersheds will be included in the total pollutant load leaving the basin. These mechanisms include channel routing of flow and soluble pollutants, and scour and deposition of sediment (and attached pollutants) in stream channels. In addition to these processes, the research effort will investigate and model the differing behavior of both forested and agricultural lands.

In summary, the basin model resulting from this study will be applicable to the evaluation of pollutant contributions from basins composed of both forests and croplands. In addition, data produced from aerial remote sensing will be examined and analyzed for possible use in model application.

R803727 01

The major objective of this project is to identify possible impacts of coal mining and development in the Northern Great Plains on the surface and ground water systems of the surrounding area. Specific objectives are: (1) obtain an equation of balance for all water inflow and outflow in each of three study sites, one each in Montana, North Dakota, and Wyoming; (2) characterize the overburden from a physical and chemical point of view as well as determine its relationship to the water coming to the surface; (3) characterize the chemical features of the mined sites; and (4) determine hydrologic character of spoils at active mine sites in Montana.

The proposed work is a key effort in the EPA program to assess the surface and ground water problems associated with western coal.

Three sites will be studied. The first phase of this work is the collection of base line data before mining. Some data will be collected at two active mining sites in Montana to provide data for the analysis.

R803728 01

A number of citrate analogs, with fluorescent tags, and "suicide compounds," will be prepared so that they may be evaluated as selective or differential agents in colliform, aeromonas and vibrio enumeration media. These materials will therefore aid in the development of improved methods for the enumeration of the above mentioned organisms as potential indicators of water quality.

The citrate analogs will be prepared in such a way that the three point attachment of citric acid will not be disturbed. The fluorescent tag will therefore be attached specifically to the free acetic acid residue and will allow the rapid and facile differentiation of e. coli from other colliforms.

The "suicide" compounds will be amino acid, fatty acid ester, or carbohydrate analogs bearing a toxic moiety such that deaminative or hydrolysis of the compound will eliminate the organism. These selective eliminations will permit more accurate analytical techniques to be utilized in water quality evaluation without interference from background organisms.

R803735 01

Objectives: (1) To determine the source, transfer and transformation of potential pollutants on a rangeland watershed grazed by beef cows. (2) To determine the monitor the hydrologic and meteorologic parameters necessary to establish the water budget and movement of potential pollutants from a rangeland. (4) To determine effects of cattle waste concentration, chemical composition and distribution on levels of potential pollutants in rangeland soils.

Approach: The water budget of the 70 hectare watershed will be determined by measuring precipitation, soil water storage, and runoff. Evapotranspiration will be determined by difference and from meteorological data. The source, transfer and transformation of potential pollutants will be determined by measuring selected nutrient levels in soil, plant, precipitation, feces and runoff water and sediment samples. Seasonal rates of degradation will be determined by periodically measuring the quantity and chemical composition of feces and selected soil, plant and microclimatic factors. Forage chemical composition and utilization, cattle diet and grazing behavior, and feces and urine distribution will be also determined periodically.

Current Plans: The soil, vegetation, and topographic surveys will begin as soon as funding is granted. Soil, plant and cattle studies will begin after the surveys and inventories are completed. Meterological studies will begin after the necessary instruments are purchased and made operational on the watershed. Runoff water and sediment sampling will begin as soon as construction of the weir and installation of the sampler is completed. Laboratory Analysis will be conducted with minimum time lapse after collection.

R803737 01 0

This small scale pilot plant R&D program is divided into two parts. The first part is concerned with the liquid extraction of acrylonitrile and acetonitrile from acrylonitrile plant effluent. The approach and plan are the same in both parts.

The following statements concerning Part I are applicable to Part II:

Solvents have been found which will, according to theory and laboratory experimental results, reduce the caprolactam concentration in the effluent down to ppm. The extraction will be followed by a distillation step in which only a very small proportion of water is distilled. It appears that this proposed process will require approximately 10% of the heat required to distill all the water.

### R803740 01

The purpose of this investigation is to develop a methodology and a monitor to detect a chronic or acute industrial discharge to a municipal treatment system which would cause process upset and poor performance. Biological sludge normally encountered in a municipal system will be employed in a laboratory biological treatment unit to simulate the operation of the wastewater treatment plant. The ten industrial wastewaters determined to be major contributors will be selected for evaluation in the laboratory simulator at varying dilutions with a residential municipal waste. The monitor will be evaluated on a pilot plant unit using a municipal waste. Parameters which will be measured include pH, DO, conductivity, temperature, $BOD_5$, TOC, COD, and SS. Several other alternative monitoring approaches will be evaluated, such as biological inhibitor detector (BID), ATP, TTC, and oxygen uptake rate.

An evaluation will be made of the effects of the selected wastewaters in various dilutions on the performance of municipal biological wastewater treatment system.

### R803741 01

The presence of Salmonella in aquatic or terrestrial environments is unequivocally proof of fecal pollution. An actual disease risk for man or animals is, therefore, present. Plans are to enumerate the Salmonella serotypes, their numbers, and actual presence in certain rivers and lakes. Water, bottom sludge and freshwater fauna would receive bacteriological examinations. Comparisons as to the total coliform indices (fecal coliforms) and presence and numbers of salmonellae will be made using appropriate standard and recently developed laboratory methods. We have isolated at least 12 Salmonella serotypes from water, bottom sediment, the body slime and gastrointestinal content of fishes. Salmonella were also cultured from fresh water mussels. Water quality relating to fecal pollution may be monitored utilizing aquatic fauna and indices to ascertain degrees of fecal pollution.

### R803742 01

Under sub contract Micro Pore Research will construct and install at Resdons plant a electrodylsis system based on recent Micro Pore Technology. It will be designed to remove a minimum of 500 g/hr from a 0.5 g/l first rinse solution and 3 g/hr from a second .01 g/l rinse tank. The unit will operate to close the loop in the Watts type nickel rinsewater, thus reducing the overall plant waste load and volume handled by the chemical treatment system. Economic factors are the recovery of the nickel solution and the reduced cost of the chemical treatment system.

## R803753 01

Reverse osmosis (RO) will be used to treat rinse waters from electroplating operations. This continuation program will consist of two phases. In Phase I, an RO unit will be installed on a zinc cyanide or acid zinc line and operated in an open loop; that is, with reuse of purified water for rinsing but discharge of the RO concentrate. In Phase II an evaporator will be installed to further dewater the RO concentrate and the combined system operated closed-loop; that is, with return of the RO concentrate to the plating bath. Each phase will last for seven months.

## R803755 01

This project will examine the influence of dosage on the disposition and metabolism of various $^{75}$Se-selenium compounds administered to rats in drinking water and will investigate the quantitative and temperal relationship of selenium and GSH-peroxidase activity in tissues where GSH-peroxidase may exert a protective effect against oxidative damage of membranes and other cellular elements. Three approaches will be used in this investigation: I. Examine the absorption, distribution and excretion of $^{75}$Se-selenium and the influence of dosage and chemical form on those parameters in experiments ranging up to 24 hours; II. Investigate the biotransformation of inorganic and organic selenium compounds and the relationship of selenium to the hepatic mixed function enzyme system; III. Measure the absorption and distribution of $^{75}$Se-selenium administered chronically in drinking water and study the influence of various factors, such as mineral content in the water and dietary fat, carbohydrate, or protein intake.

The information generated by these investigations will provide a more rational basis for determining the range between nutritionally adequate and toxic levels of selenium in drinking water.

S803758 01

Description of the Program - The program involves establishing a multi-material source separation system in Marblehead, Massachusetts:

- Weekly curbside collection of flat paper and mixed cans and glass; and
- Use of a compartmentalized collection vehicle

Program elements include: 1) Feasibility analysis (already completed); 2) Program design; 3) Implementation; and 4) Evaluation and documetation.

Objectives - The objectives of this program are as follows:

- To demonstrate and evaluate a multi-materials source separation program
- To document the demonstration and facilitate information transfer to other communities across the country.

In accomplishing the objectives outlined above, the program will demonstrate alternative source separation techniques, collection methods using a compartmentalized vehicle, and innovative methods of developing public participation in the program. It is anticipated that the results of this demonstration program will be of considerable benefit to other municipalities across the country, and that the techniques developed can be directly transferred to other source separation programs.

R803761 01

The principle objective of this work will be to adapt the centrifugal chromatography method for use in the separation of algal pigments from natural surface waters. Many different column adsorbents and solvents previously used to separate the chlorophylls will be tested to determine which will give the best separations in the shortest time. The initial phase of the study will be devoted to the determination of the parameters of separation with standards of chlorophyll a, chlorophyll a + b, extracted spinach, and extracted algal cultures. Then a survey will be conducted with natural water samples. This method will be compared to other methods used in water quality laboratories for analyzing phytoplankton biomass and primary productivity.

## R803762 01

The objectives of this study are: (A) To determine the extent of vegetation injury and death associated with operating and completed refuse landfills throughout the U.S. (B) Determine the factors which contribute to this vegetation injury or death. (C) Present recommendations as to how to protect vegetation existing adjacent to a refuse landfill. (D) Establish recommendations as to how to determine when and how to plant vegetation on and/or about a refuse landfill. (E) Establish recommendations as to what species of vegetation would be best suited to living on and about a refuse landfill.

The project will include field and laboratory investigations. The field investigations will involve both a mail survey of the continental U.S. and Puerto Rico to determine the extent of vegetation growth problems associated with refuse landfills. This will be followed by on-site inspection of selected sites in 7 of the 8 major U.S. meteorological regions. Measurements will be made of the soils, ground gases, and other environmental parameters at each of the field sites. The laboratory investigations will entail a study of the effects of landfill gases and growing conditions upon selected vegetation. Representative vegetation will also be planted at selected landfill sites and observed for growth responses during this study.

## R803764 01

The purpose of this proposed study is to determine the point in time and the radiation dosage level at which the life span shortening effect begins to exert itself in white rats. A minimum of 300 Sprague-Dawley pregnant rats will be used. They will be exposed to 6.6, 26.0, 46.0 and 66.6 rads of chronic radiation (tritiated water - HTO) during pregnancy. The pregnant rats (determined by vaginal smears) will be weighed and placed in individualized cages for observation. We will get the cages and glove boxes from the Research Triangle Park (RTP), possibly on a loan basis. Our small animal room will be air conditioned and an exhaust system will be installed.

The rats will be initially exposed at the RTP and transferred to St. Augustine's College for observation.

Rats that show signs of stress, i.e., weight loss or sickness will be sacrificed and the pathology of selected tissues will be done. The pathological condition of sick rats will be compared with healthy rats. The results of these observations over a long period (3 to 4 years) of time should give some indication of the onset of the life shortening phenomenon as brought on by chronic HTO irradiation at 6.6, 26.0, 46.0 and 66.6 rads.

S803766 01

1. To demonstrate the use of intermittent sand filters as a means of upgrading treatment systems for small meat packers to meet 1983 NPDES guidelines
2. To develop a simple and economically feasible technique for monitoring the treated waste from small meat packing plants which could meet the NPDES monitoring program.
3. To provide the small meat packers with information related to the construction, operation, and maintenance of intermittent sand filters.

S803769-01

The objectives of this project are to confirm and demonstrate the technical and economic feasibility of disposing of sewage sludge in combination with municipal refuse in the Union Carbide PUROX System, and to establish the environmental effects of this means of disposal.

The project will be carried out at Union Carbide Corporation's full scale test facility in South Charleston, West Virginia.

S803770 01

Objectives: a. Utilize energy that currently is unused as one step in an overall program to conserve natural resources.
b. Show methods of economically and reliably heating, cooling, and managing enclosed growth structures using heated water for energy.
c. Evaluate the adequacy and determine problems of enclosed growth structures as supplementary horizontal cooling towers with income potential.

Approach: Possible uses of low temperature water were studied. Enclosed plant growth structures were identified as one of the best possibilities. Investigative trips were made to a number of plant growth facilities using traditional heating methods. Trips also were made to ORNL, TVA, and EWEB to study and discuss laboratory and pilot methods of extracting heat from low temperature water. The heating system was designed using pipes in the soil and finned tube unit heat exchangers. The system permits the addition of heat pumps to raise the water temperature, if necessary. Cooling is accomplished by an evaporative pad and air moving system.

Current Plans: The structure will be erected in mid 1975 and will become operative immediately. Boilers will be used to provide the warm water as the power plant is under construction and will not begin operation until 1976. Tomatoes will be the initial crop. Seedless cucumbers, lettuce, roses, chrysanthemums and forest tree seedlings will be included later. The project should demonstrate the economic feasibility of using otherwise wasted heat and result in a number of commercial applications being provided heat by the new generating plant and by others scheduled for future construction.

R803773 01

Project objectives are demonstration of solvent extraction as a treatment method for wastewater from various acetic-acid manufacture processes, as well as determination of the most attractive process configuration, choice of solvent(s) and operating conditions. Experimental information will be obtained on composition of wastewaters, equilibrium with solvent phases, efficiency of extraction in a mini-plant RDC countercurrent extractor, and regeneration of solvent by evaporation and rectification. The incentive for recovery of chemical values from the extracted pollutants will be investigated.

Principal extraction processes initially under consideration use both a relatively non-volatile polar solvent, and a non-polar volatile solvent, with the former serving the purpose of removing the majority of the COD content of the wastewater, and the latter serving to remove residual dissolved polar solvent from the treated water.

R803774 01

Study determines virus content and distribution in three water-borne solids: (a) filter "mud", the residue from prefilters and membrane filters used to concentrate viruses; (b) activated sludge solids; and (c) feces (or segments of intestinal tract with fecal contents). Solids will be fractionated on basis of density and particle size by settling and centrifufation. $^{125}$I- or $^{32}$P-labeled entero-, reo- and adenoviruses will be added to each fraction to determine reversible and irreversible binding of viruses, to study factors affecting release of viruses from each fraction, and to determine antigenic or physical changes in the virions. Fecal pellets and compacted sludge solids will be fixed and embedded in water soluble polymers. Sections will be examined by autoradiography and electron microscopy for concentrations of viral antigen associated with monocytes, exfoliated cells, bacterial flocs, ciliates, etc. Viruses coated with coproantibody will be concentrated by means of 2-phase polymer systems, and quantitated by RIA and immunoelectron microscopy. Field studies of wild enteroviruses in activated sludge solids and combine overflows will be initiated at Syracuse, New York.

R803777 01

Our objective is to study the recycling of waste plastics by reinforcement with glass fibers. Recycling plastics involves reheating which can cause the plastic to lose strength and become embrittled and discolored. The principal problem in recycling or reprocessing plastics is that different polymers are generally not compatible with each other. Blends of incompatible polymers are frequently very brittle and cannot be considered for many applications. Glass reinforcement increases tensile strength, modulus, heat distortion temperature, compressive strength, flexural strength, abrasion resistance, and flame resistance. Our objective is to reinforce plastic blends of polyethylene, polypropylene, polyvinyl chloride and polystyrene and, thereby, obtain structural plastics.

R803778 01

The primary project objectives are: (1) the development and operational evaluation of a comparatively inexpensive system for automatic, real-time acquisition and analysis of hydrologic data from multiple remote locations, (2) development and testing of a distributed parameter watershed model for real-time catchment simulation, and (3) implementation of the data acquisition system of the first objective on a 12,000 A watershed approximately 125 mi. from the on-line acquisition computer.

The on-line mini-computer acquisition system uses a dedicated telephone line to acquire data from the remote watershed. Transducers on the watershed are battery operated and use radio telemetry to send data to a central location where it is stored and simultaneously transmitted to the remote computer.

The watershed model is based upon the concept of sub-dividing the catchment into small elements and integrating their dynamic responses. Real-time simulation will be based upon the data transmitted to the on-line acquisition system. Actual simulation calculations will be accomplished on a computer separate, but linked together with, the on-line mini-computer.

The test watershed on which the automatic instrumentation will be installed also has water quality sampling equipment. The operation of this equipment will be controlled using a feed-back concept based on an analysis of watershed conditions by the on-line mini-computer.

R803779 01

The primary objectives of this study are 1) to evaluate the standard COD proceudre, using silver sulfate as the catalytic agent, for the purpose of understanding more about the nature of the chemical process, 2) to evaluate other non toxic metal ions that may be used as substitutes for silver as catalyst in COD determiniations, and 3) to evaluate new catalytic agents for COD determinations, standardize the procedure, and test their validity on real world samples.

The successful completion of this one year project should give rise to a reservoir of useful comparative data on the standard COD procedure and an economically available substitute catalyst for silver sulfate in the standard determination.

R803787 01

The objectives of the proposed research program are to develop and characterize processes for the recovery of metals from metal-finishing waste.

The approach involves the use of metal-finishing waste obtained from a sludge lagoon of an existing operating facility and the application of thermal, chemical, and electrolytic operations in order to recover the valuable and/or toxic metals from the sludge in marketable or reusable forms.

The system proposed includes leaching followed by electrolytic recovery of copper and nickel, and a subsequent roast-leach sequence to recover chromium values.

R803788 01

Objective: To study surface stability and water and salt movement in and through soil-covered spent oil shale produced by the Paraho retorting process.

Approach: Field plot work in the oil shale area of northwestern Colorado. Paraho spent oil shale covered with different depths of soil will be monitored for water and salt movement in the spent shale. Vegetation cover and species will be observed as a function of soil depth over the spent shale. Data will go into a water quality model.

Current Plans: If funded, the research will be initiated in the summer of 1975.

R 803791 01

The basic objectives of this investigation is to estimate and assess the life quality parameters of a population subjected to competing risks, such as being exposed to risks of death which may be either disease oriented or extraneous or induced. This situation is called the case of competing risks. The usual life table method of estimating survivorship assumes a constant mortality rate in each class interval. This is not consistent with real world situation because besides the disease factors, this method totally ignores the phenomenon of aging and other competing environmental and disease oriented risks. In the field of modeling where concomitant competing risks are present, this proposed investigation hopes to overcome to a large extent the major shortcomings of the currently available methods in the literature, such as the assumption of a constant mortality rate for each risk factor because it is the simplest thing to deal with and finally the lack of small sample procedures for dealing with techniques based on more realistic assumptions on the mortality rates in the presence of both marginal as well as simultaneous (competing) risks. We therefore propose to deal with the competing risk problem mentioned above by first dealing with the raw data without resorting to any grouping whatsoever, and secondly, by assuming very realistic models for the mortality rates which reflect the real life experiences and finally by applying the recently discovered (see EPA reports 1, 2, and 3 by Murthy et al.) and more appropriate than the current statistical methods for dealing with the new models and assessing their relative performance. Examples based on data to "Event" from various environmental, energy-orientated and clinical disciplines will be extensively dealt with in the proposed effort.

## R 803794 01

The long range goal is to demonstrate the applicability of a marsh (natural or artificial) treatment system to control and/or prevention of water pollution by municipal discharge from small communities. Artificial marshes constituting a pilot plant and consisting of several shallow, plastic-lined basins have been constructed. Several species of emergent vegetation have been tested and the soft-stem bulrush, Scirpus validus, has been selected for intensive studies. The pilot plant has received municipal secondary effluent and will receive primary effluent in future work. Flows into and out of basins are metered and sampled periodically. Plans are made to study several different retention times. Nutrient removal is effected by harvesting and physically removing leaves and stems. Nutrient (especially phosphorus) removal is maximized by harvesting young shoots. Harvesting is possible at three to four week intervals during the growing season. High reductions have been observed in BOD, suspended solids, and numbers of coliform bacteria. In addition to pilot plant studies an evaluation is being made of changes in quality of polluted water flowing through a natural marsh. It appears that in the case currently under study the effect of the marsh is to improve the character of the water flowing into it to a quality better than that upstream from the pollution source.

## R 803797 01

A continuous watershed simulation model will be modified and then tested and verified as a tool to evaluate feedlot runoff control over a wide range of climatic conditions of the United States. Components of the model will include the feedlot surface rainfall-runoff relationship; process generated wastewater, reservoir operations, an disposal component by land application or evaporation.

This model will then be used to develop a more detailed design model to generate design parameters and functions based upon site specific details including climatic conditions, soil characteristics and land availability for disposal.

The model will provide a tool to integrate the various phases of previous current research on feedlot pollution control and disposal of pollutants into a continuous system that will allow evaluation of the degree of pollutant control expected under various conditions.

R803799 01

The objective of this project is to develop, demonstrate, and use methods and procedures for clarifying the relationship between oxidant precursors (specifically hydrocarbon and oxides of nitrogen) and oxidant (ozone) based on studies of ambient air. Understanding of this relationship is vital to sound development of control strategy, air quality standards, and emission standards. In photochemical smog the major health hazard (ozone) is a secondary product of a very complex reaction of primary pollutants (hydrocarbons and nitric oxide) which are not themselves highly toxic.

A new gas chromatographic procedure has been devised which permits direct measurement of ambient concentrations of methane,ethane, acetyplene and total $C_3^+$ hydrocarbons. This procedure is automated to provide repetitive samples around the clock. These data will be compared with $NO_x$ data and oxidant levels to better define the relationship between oxidant and its precursors, hydrocarbon and nitrogen oxides. The intensive data collection phase of the project is just beginning (February 1975).

S803801 01

The objective of the project is to demonstrate the feasibility of, and the methods by which, pollutional discharges containing high concentrations of dissolved metals may be abated from two inactive pyrite mines and their pyrite-laden wastes washed into the stream bed and flood plain of Contrary Creek.

The project will be implemented by: (1) determining the extent of surface and underground mining and their interrelationship, (2) documenting existing stream quality problems by evaluating available existing stream and discharge flow and quality data; (3) evaluating specific abatement measures that can be utilized; (4) estimating costs and effectiveness of applicable abatement measures; (5) constructing those abatement measures deemed to be most effective for the money expended; (6) monitoring streams before and after construction to determine effectiveness of abatement measures; and (7) performing a biological evaluation of the receiving waters after construction to be correlated with a biological evaluation already conducted.

This project area was selected because: (1) the affected area is relatively small but is causing severe water quality problems; (2) techniques proved to be effective here can be used in similar problem areas; (3) the pollutional discharges flow via Contrary Creek into Lake Anna, the waters of which will be used for cooling purposes at a nuclear power plant currently under construction downstream. Significant concentrations of heavy metals in solution in the cooling waters could cause serious problems during power plant operation.

## R803802 01

Atmospheric fates of many of the halogenated compounds proposed here for study are unknown. Significant quantities of these compounds are emitted into the troposphere, and the sources are primarily anthropogenic. Many halocarbons have been measured in the ambient air, and this list will be expanded by using new cryogenic concentrating procedures. New and better calibration methods will be developed. Initial investigations indicate that both stratospheric and tropospheric removal mechanisms are operating. The possible stratospheric ozone destruction by stable halocarbons, the toxicity of phosgene, and the indicated carcinogenicity of vinyl chloride and its structural similarity to other ambient chloroethylenes make continued research urgently needed. It is also imperative to study the unknown long-term effects of halogenated compounds, their reaction products, and the potential utility of halocarbons as tracers of large air masses.

The fate of the proposed halocarbons will be assessed in three phases: (1) ambient halocarbon measurements at urban, nonurban, over-the-ocean, and background locations, (2) laboratory irradiation experiments to study the tropospheric chemistry of halocarbons under representative atmospheric conditions, and (3) validation and assimilation of available information on a continuous basis. Nonreactive halocarbons will be used to study the transport of other important urban air pollutants (e.g., $O_x$ and $SO_x$) to surrounding nonurban areas. Preliminary studies on stratospheric removal mechanisms of stable compounds will be conducted.

The overall effort will be coordinated with other SRI research activities to optimize instrument (SRI Mobile Laboratory) and manpower availability, and will be completed in 36 months.

## R803804 01

Three underdrained pilot infiltration-percolation basins that have been constructed will be subjected to weekly application of 0.46 and 0.61 meters of stabilization pond effluent by flooding. By analyzing samples of influent and effluent and recording water level changes in the pilot units, the infiltration-percolation system of land disposal will be evaluated.

Specific objectives of this investigation are to:

1. Demonstrate the use of infiltration-percolation land disposal as a means of up-grading existing secondary treatment to meet new effluent standards for BOD, suspended solids, and fecal coliforms while removing phosphorus and oxidizing ammonia nitrogen to nitrate to meet new ammonia standards,

2. Determine acceptable loading rates for both a scarified and undisturbed silty loam soil, underdrained with perforated pipe at a depth of 2½ feet, for climatic conditions similar to those at Brookings, South Dakota and,

3. Identify winter operating constraints imposed by the climatic conditions at this site.

R803809 01

The objective of the proposed research is to evaluate static high pressure (SHP) as an improved method for preserving water samples for microbiological and biological analyses and for shipping reference check samples to laboratories participating in quality assurance programs.

SHP will be evaluated by testing selected pure cultures of Escherichia coli, Streptococcus faecalis and the alga, Selenastrum caprocornutum under varying pressure, temperature and storage time conditions and with various cryogenic preservative agents. The cultures must maintain stable, viable counts. Control samples will be held under the same environmental conditions with no pressure applied and bacterial densities will be compared to those under test conditions.

When optimum conditions are established additional cultures representative of waterborne pathogens and fresh, saline and wastewaters will be tested. Reference check samples will be tested in cooperation with EPA laboratories. In the final phase SHP equipment will be designed specifically for the preservation of field samples and shipment of reference check samples.

R803813 01

This project will document the type, amount, and characteristics of hazardous substances into one of the largest Class I landfills in the Western United States.

Composite samples of different waste streams will be taken for analysis of chemical composition. Hazardous substances in the particulate and dissolved forms will be separated. The annual deposition rates of different substances (e.g., Hg, Cd, organochlorine, phenolics, carbamates) will be estimated.

This study will be conducted in conjunction with a comprehensive study on the flow of hazardous wastes in the State of California by the California State Department of Public Health. Data obtained on other landfill sites in the Southern California region will be included for comparison.

R803814 01

The objective of this study is to determine the rate and extent of reaction of sulfur dioxide and other air pollutants at ppm concentrations with aerosol droplets of the order of size of one micron. In the initial experiments radioactive $^{35}SO_2$ will be transferred to aerosols, and the total radioactive sulfur transferred counted. Models of the mass transfer and reaction will be fit by the experimental data, and used to elucidate the mechanism and extent of reaction.

R803818 01

(1) Objectives - The primary objective of this proposal is the development of methods and techniques to formulate laboratory diets for larval and juvenile marine fish. Such diets are needed in order to achieve high levels of survival and field-comparable growth of laboratory-cultured animals. If successful, the laboratory marine fish will exhibit minimum variability in lab bioassay due to nutritional stress. *Menidia menidia* and *Pseudopleuronectes americanus* will be used as test fish.

(2) Approach - Test diets will be evaluated for protein availability and storage stability. The nutritional status of field and diet-fed populations will be compared The life history stages will include eggs, yolk-sac larvae, post-yolk-sac larvae and juveniles.

(3) Current Plans - Apparent nutritional needs will be determined by qualitative analysis of eggs, yolk-sac larvae, post yolk-sac larvae and juveniles. The sources of nutrients will be determined by qualitative analysis of laboratory-prepared live or artificial food materials. The test diets formulated from qualitative information will then be assessed for protein availability and storage stability using growth studies with the test fish, rat and rainbow trout. Finally, the nutritional status of the larvae and juveniles will be compared with field populations using appropriate response parameters: survival, growth, biochemistry, behavior and stress response.

R803819 01

The objective of this project is to develop a comprehensive mathematical model which provides a rational design method for feedlot pollution control facilities. The design of an optimum feedlot pollution control system will consider the historical rainfall and temperature records of the selected location, the free water surface evaporation rate, the ability of local crop land to accept feedlot runoff as well as applicable pollution control regulations. The output of this design procedure is the retention pond volume, irrigation system capacity and land area required to meet various degrees of pollution control.

Once this model has been developed and listed, it will be used to construct a set of runoff-reservoir design nomographs for each of the test sites. Further utilization of the model will allow input of data from any new site by inputting the appropriate climatological and soils data.

R803820 01

**Objectives:**

This project proposes to investigate the fate and impact of a spill of pentachlorophenol (PCP) in a freshwater lake ecosystem. The primary objectives are: 1) Observe changes in the PCP concentration with time in the water, sediments and organisms, to determine how long PCP poses an environmental hazard and to observe any new influx of PCP from undetected reservoirs; 2) Assess the capability of the freshwater ecosystem to assimilate the acute influx of the persistent, toxic chemical including information on the mode of transport, sites of accumulation, biological magnification, rate of degradation and major degradation products.

Approach:

Samples will be collected bi-monthly at six sampling sites from the water column (dissolved and particulate PCP), sediments and selected organisms. Analysis will involve extraction into chloroform, methylation with diazomethane and quantitative and qualitative identification with electron capture gas chromatography. Special studies regarding impurities and degradation products of PCP will involve the use of GLC, TLC, IR, fluorescence and mass spectrometry.

Pentachlorophenol is a highly toxic chemical with wide application as a wood preservative. Concentrations of PCP have been found in streams and lakes and in fish and drinking water supplies taken from contaminated waters. It is anticipated that the proposed investigation will provide information needed to determine the fate and impact of PCP in a natural aquatic environment.

S803822 01

The purpose of the project is to improve the water quality of Galena Creek and Dry Fork of Belt Creek by reducing the acidic waters entering the creek. Reduction of the formation of acidic waters will be accomplished by dump surface manipulation, mine dump sealing, and stream channel rerouting.

R 803825 01

I. **Objectives** - 1. To demonstrate on a commercial scale total recycling of spent brines produced during pickle fermentations.

2. To determine whether significant build up of potentially toxic substances will occur with recycling.

3. To determine the degree of reduction of waste effluents which can be attained by implementation of this procedure.

II. **Approach:** Spent brine from commercial cucumber fermentations will be either pasteurized or chemically treated with NaOH to inactivate potential softening enzymes and kill microorganisms. The treated brine will be reused as a cover brine in commercial cucumber fermentations. This will be done for two brining seasons.

Brines will be analyzed for appropriate waste parameters, microbiological counts and mineral content, including Pb, Cd, Hg and pesticide buildup. Fermented cucumbers will be analyzed for bloater damage, organoleptic quality, texture, mineral analysis and pesticide accumulation.

Data will be obtained on pectinase stability in spent brines to minimize energy or chemical requirements for treatment and to assure adequate treatment.

The cost of each treatment method and the degree of waste reduction achieved will be determined.

III. **Current Plans:**

To initiate this approach for the 1975 cucumber brining season.

S803828 01

The primary objective of this demonstration is to demonstrate the technical and economic feasibility of composting raw dewatered municipal sewage sludge by high rate suction aeration under the adverse climatic conditions typically experienced by many of the municipalities located in the New England, Great Lakes, Midwestern, and Northwestern States. Secondary objectives consist of a wide range of operational and procedural elements all related directly or indirectly to the physical location and climatological conditions of this demonstration.

The sludge will be delivered to the site once per week at a volume of approximately 50 cu. yd. Upon arrival at the site wood chips are mixed with the sludge at a ratio of 3:1, wood chips to sludge by volume. The mixture is then moved to the composting area which is a concrete pad with two twenty foot lengths of pipe connected to a blower. The blower operates at two minute intervals every twenty minutes. The blower draws air through the mixture and assists the composting pile in achieving higher and more even temperature distribution. The wood chips absorb moisture and create voids which also assist in the thermal distribution and assist in keeping a constant oxygen content. Temperatures must exceed 55 degrees Centigrade throughout the pile to insure complete pathogen kill. Therefore, temperature and oxygen content must be monitored daily. The entire process takes approximately fourteen days. An additional thirty days of curing after the pile is removed from the blower area is recommended before use, as the pule will continue to compost naturally. The final product is useful as a supplement to commercial fertilizer and can assist in lowering the cost of maintaining public land. Also the disposal of sludge is eliminated and if successful this process will eliminate the need for expensive digesters presently used in secondary waste water treatment plants.

R803838 01 0

The purpose of the proposed research would be threefold: (1) to determine how sublethal levels of juvenile hormone mimics and insect growth regulators may effect survival of developing invertebrate larvae, from hatching to the juvenile stages, the way in which these compounds may alter the length of larval development under laboratory culture conditions, and how the effect of these compounds may be diminished or accentuated by stress conditions of the environment; (2) the way in which sublethal levels of these compounds may effect behavior of larval stages, initially determined experimentally by measurement of swimming speeds and directional orientation to a light stimulus (phototaxis); and (3) the way in which sublethal levels of these compounds may produce long-term mutagenic effects on small marine copepods which can be maintained under laboratory culture for up to 45 generations.

R803839 01

Amounts of chlorine presently used in the drainage basin of Chesapeake Bay, and probably also some other large estuaries, could be large enough to sterilize the Bay if this chlorine were not degraded. A review of degradation processes reveals that perhaps 1% of the total chlorine may be converted to halogenated organic compounds, and it is suggested that some of these may be long-lived and susceptible to biomagnification. Arguments are given to indicate that organic compounds produced by chlorination of estuarine and marine waters may differ fundamentally from those produced by chlorination of river water and sewage in that bromine derivatives may predominate over chlorine derivatives in the marine waters.

A research project is proposed to test these ideas in the field near a power plant which employs 4-15‰ estuarine water for cooling, and chlorinates this to control fouling. The site is free of other nearby anthropogenic sources. The objectives of the project will be to: (1) identify and quantify the halogenated organic compounds produced by the plant, and (2) determine chemical factors controlling yields of the various compounds by studying the cooling waters under a variety of conditions.

R803842 01

The overall objective of this research effort will be to determine the effect of salinity, temperature, light, and sterility on the persistence and degradation of representative organophosphorus, carbamate, and organochlorine insecticides in natural seawater. Surface water samples varying in salinity from zero to 30 ppt will be amended with insecticide chemicals and incubated for varying lengths of time under varying conditions of light, temperature, and sterility. Insecticide residues and degradation products will be sought by gas-liquid and thin-layer chromatographic methods.

R803843 01

(1) The objective of this study is to develop an information manual, a technical report and obtain 16 mm color film footage for a training film on the protection and restoration technology for marshes, bogs and shorelines of cold-climate environments endangered or damaged by oil spills. The information manual will be designed to acquaint land managers, industrial concerns and others with available technology, rationale and experts who can be of assistance in treating damaged sites as well as preventing damage to endangered sites. The technical report will cite research advancements and identify areas needing research attention. The film will focus on peculiar problems of cold climates, such as ice, storm conditions and habitat uniqueness.

(2) The work will focus on literature searches, interviews, and on-site observations. Persons involved with petroleum resource extraction, refinement, transportation and marketing, oil spill researchers and land management responsibilities will be interviewed. Spills and pertinent research sites in Alaska and adjacent Canada will be examined, evaluated for their effectiveness and limitations in cold climates.

(3) Currently literature search is underway and contacts for potential interviews are being established. The principle investigator has scheduled attendance at the 1974 Conference on Prevention and Control of Oil Pollution in San Francisco, California. All oil spill reports received at the Anchorage EPA office are being cataloged for compilation.

## R803844 01

The purpose of the project is the determination of the potential health hazard posed by enteric viruses contained in the effluents of wastewater treatment plants used in irrigation schemes. The approach used is the plaque assay for poliovirus as viral indicator organism in plant influents, effluents, ground waters and ultimate receiving streams as well as in soil core eluates. Assays are to be performed immediately after irrigation and at several times thereafter to determine viral die-off rates and migration rates. Seasonal influences (heat, cold, drying, soil saturation) will be studied as well.

In laboratory studies, virus recoveries from cores dosed with poliovirus in plant effluent have averaged 20% and survivals as long as 15-35 days have been obtained at room temperatures. The comparison with field conditions is critical.

## R803846 01

The program is divided into two tasks. The first task involves the study of the role of peroxy radicals in the oxidation of NO, $NO_2$, and $SO_2$ in photochemical smog. The specific objective is to study and evaluate the rate constants for the reactions of peroxyacyl and peroxyalkyl radicals with NO, $NO_2$, and $SO_2$, and the reaction of hydroperoxy radicals with $SO_2$.

The second task involves the determination of the fate of aromatic hydrocarbons in the atmosphere and their contribution to smog formation. The specific objectives are to evaluate the products of the reaction of hydroxy radicals with toluene and related compounds and to determine the rate constants for the reaction of p-cresol, one of the products, with hydroxy radical and ozone.

## R803847 01

The purpose of the proposed project is to produce a report that (1) describes the complex institutional arrangements that are presently involved in managing the environmental concerns of the nation's metropolitan regions, (2) that develops a set of criteria, supporting arguments, and procedures for evaluating the entire set of institutional arrangements for regional environmental management in specific regions, and (3) that provides a conceptual framework for assessing existing or anticipated policy decisions, such as legislative provisions, regulations, or organizational reforms that are related to regional environmental management.

The report from this research is meant to provide a comprehensive perspective to aid Federal and state policy-makers in assessing specific policy decisions. It is meant to provide a state-of-the-knowledge assessment that will suggest needed research or program initiatives. And, it is meant to provide a background for case study evaluations of specific policy choices or of institutional arrangements in particular regions.

The approach consists primarily of analysis and integration of pertinent literatur from the fields of environmental management and regional governance, supplemented with limited visits to selected states and regions and interviews with a number of scholars and public officials knowledgeable in the field.

R803849 01

1) Measure adsorption and desorption characteristics and major parameters required to describe these processes over a wide range of chemical concentrations (zero to container concentration) for selected pesticide-soil systems; 2) Determine the influence of initial and imposed soil-water conditions and adsorption-desorption characteristics on the movement and distribution of selected pesticides when applied to the soil at high concentrations; 3) Measure chemical and microbial degradation rates and identify toxic or selected metabolites in specific soil-pesticide systems receiving high organic chemical concentrations; 4) Determine the influence of high pesticide concentrations on soil microbial activity for selected soil-pesticide systems; 5) Demonstrate the applicability of existing mathematical models to describe migration and degradation rates in soil-pesticide systems associated with chemical disposal sites.

The mobility, adsorption-desorption characteristics, and degradation rate of methyl parathion (insecticide), 2,4-D (herbicide), atrazine (herbicide), triflurolin (herbicide), and terbacil will be studied using various soils and high pesticide concentrations. Toxic and nontoxic metabolites of these pesticides will be identified and their production during microbial and chemical degradation quantified. Analytical and commercial formulations of each pesticide as well as $^{14}C$-labeled chemicals will be used throughout the study period. The major goal of the project will be to identify parameters and processes that can be used to predict the behavior and fate of specific pesticides in a waste burial site. A mathematical model will be evaluated for its ability to describe the movement and distribution of a pesticide from a point source of high concentration (disposal).

R803851 01

Aerosol size distributions are being measured in St. Louis as part of the RAP's program from both ground based and aircraft mobile laboratories. These measurements are being made in conjunction with a complete array of chemical, physical and meteorological measurements. In conjunction with other collaborators of the team, new models for the conversion and transport of sulfate areosols are being developed.

Also, experiments on the generation of sulfate aerosols, $SO_2$, $NO_x$, HC, and hetrogeneous aerosols are being conducted in a laboratory smog chamber.

In addition to providing a new data base for sulfur conversion, these experiments have already provided a new understanding of the fate of sulfur in urban and power plant plumes. Also, a new trimodal model for atmospheric aerosol size distributions has been developed.

Improvements in the already developed automatic aerosols size distribution measuring system will be made. A new automatic aircraft aerosol sampler for microscopy is being developed.

Extensive efforts are also being made to develop procedures for handling large quantities of miltivariable air pollution data using a special laboratory computer system.

## R803864 01

The objective of the work is to determine the capital and operating costs for the removal of radium from potable water supplies. Data will be collected from the literature and from current EPA surveys of plants having radium in their raw water.

Cost estimates will be based on the range of sizes and types of plants that will be required for different qualities of raw water.

## R803868 01

The development of infrared Fourier Transform spectroscopic techniques to characterize certain key air pollutants, their precursors and reaction products and to establish quantitative kinetic and mechanistic details of the interrelationships between these pollutants both in simulated and real atmospheres is the primary objective of this proposed work.

In particular, FTS techniques will be used to obtain long path length atmospheric spectra to aid in the identification of trace atmospheric constituents, to study some aspects of the natural removal mechanisms of Freons from the atmosphere and of their influence on atmospheric ozone, and to study some key reactions of importance in photochemical smog formation.

## R803869 01

Salinity in the Colorado River Basin poses a serious constraint to future water resource developments in the region. As part of the decisions concerning the method of attacking the problem, it is necessary to carefully evaluate the various alternatives and select the optimal solution. The purpose of this proposed project is to develop a new extension of desalination technology by integrating methods of saline water conversion with agricultural and point source control measures. This project would serve as a procedural study and be applied to the Colorado River between the Colorado-Utah border and its headwaters. Cost-effectiveness functions for each alternative agricultural, point source, and desalting salinity control measure would be formulated and then compared in an optimization analysis to determine the most practicable means of managing salinity in the region. Socio-Economic costs as well as facility and treatment costs would be incorporated in the analysis.

R803870 01

The objectives are to elaborate techniques, other than removal of external nutrient sources, for eutrophic lake ecosystem restoration. Approaches will include identification and assessment of organisms involved in internal nutrient regeneration, e.g. carp; experiments on increasing zooplankton grazing activity by decreasing predation on the herbivores; field trials of methods for converting blue-green algae populations to populations to populations of green algae; artificial circulation studies to test various hypotheses for its effectiveness and to perfect it as a lake restoration method; full-scale application of the ecosystem appreach to lake restoration.

R803871 01

Proper disposal of sewage effluent from rural and isolated homes and businesses is one of the most difficult problems facing health authorities. This is particularly true in areas where soil conditions are unsuitable for application of leaching fields following septic tanks These conditions are in many areas having high ground water tables and in other areas where bedrock is close to the ground surface. Under these conditions, an evaporation type system concept can be used to dispose of the wastewater without adverse effects on the land or ground water.

The objectives of this study are to determine rational design criteria, estimated costs and potential applicability of evapotranspiration (ET) and mechanical evaporation (E) systems for disposal of wastewater from individual homes. Specific objectives are the quantification of major design parameters, such as soil type, saturated liquid depth and vegetative cover for ET systems and physical and mechanical factors for E systems, by thermodynamic studies, pilot studies, and in the case of ET systems, monitoring of existing full-scale systems. By use of meterologic and hydrologic data from approximately five locations in the United States, estimates of cost and applicability of these types of systems will be made for these locations, representing a wide spectrum of climatic conditions.

R803872 01

The objective of the proposed study is to determine sublethal effects of chlorine on growth, and survival of marine vascular plants and growth, survival, reproductive biology and behavior of selected decapod crustaceans. Effects and blood chemistry of the blue crab will also be investigated.

A laboratory approach will be used. Test organisms will be exposed to sublethal doses of chlorine in continuous flow systems. Pertinent biological parameters will be assayed periodically for periods of up to 6 mo. exposure. An attempt will be made to verify effects on blood chemistry of blue crabs with animals collected adjacent to sewage discharges.

S803873 01

The objectives of this study are to evaluate on a full plant-scale basis; (1) The reliability and effluent variability of a 15 mgd advanced wastewater treatment (AWT) system producing a water approaching potable quality for use in groundwater replenishment and prevention of seawater intrusion, and (2) the quality of the effluent with regard to the identification, measurement, and monitoring of trace materials (chemical, physical, and biological) and residues. Particular emphasis will be placed on the characterization of the organic materials in the effluent using the latest gas chromatographic/mass spectrophotometric procedures.

The AWT system treats the effluent from a trickling filter plant using lime coagulation and sedimentation, ammonia stripping, recarbonation, filtration, carbon adsorption, and chlorination. This effluent will be blended with desalted seawater and/or a supply of deep groundwater for injection into a domestic aquifer.

R803875 01

(1) Objective: The objectives of this project are: (a) to assess the energy conservation impact of point source treatment by high temperature hyperfiltration membranes and the direct recycle of renovated hot process water and the corresponding reconcentrated solutions of chemicals, and (b) to obtain engineering data on the performance of high temperature hyperfiltration membranes by testing at selected field-sites.

(2) Approach: (a) The impact assessment will be developed by analysis of the details of full-scale manufacturing operations selected to be typical of procedure in wide use in the textile dyeing and finishing industry. (b) The engineering performance data will be obtained employing skid-mounted test units equipped with commercial prototype high temperature hyperfiltration membrane units. The tests will be conducted at field-sites with continuous sample wastestreams from full-scale product operations. The on-site testing will facilitate the direct involvement of industrialists in the evaluation of the direct recycle of the renovated wastewater and concentrated residues.

(3) Plans: The assessment of the energy impact, along with laboratory evaluation of hyperfiltration (a screening test phase) will be carried out during summer and early fall of 1975. On-site testing and evaluation will begin by the winter of 1976, with completion during the summer 1976.

R803881 01

The objective of this investigation is to collect data on traffic flow, particulate and gaseous pollutant concentrations, and micrometeorology for a major highway in a non-urban setting. The study will also include tracer gas experiments for evaluating vehicle emission factors and disperion coefficients.

A site on a relatively undeveloped section of the heavily travelled Long Island Expressway will be used for collection of data over a period of one year. Instrument towers will be erected, in a plane perpendicular to the highway, on both sides and in the median. These towers, supplemented by ground stations, will have instrumentation to provide carbon monoxide data at 32 grid points; particulate sampling at 8 points; wind speed and direction at 11 grid points; and vertical temperature difference, temperature, relative humidity, radiation, rainfall, nitric oxides and ozone at one point. Also to be used,but not continually, are two sonic anemomometers and fourteen tracer gas sampling stations.

This data base will be used to: (1) document the distribution of carbon monoxide, lead, sulfate and total particulates adjacent to a highway; (2) study in detail the micrometerology with special attention to those parameters important in the determination of sigma and stability values and highway-generated turbulence; (3) re-evaluate highway air pollutant emission factors; and (4) determine the applicability of existing highway air pollutant dispersion models.

R803882 01

The manual of practice will set out the rationale in pre-mining site evaluation so that mining and reclamation will be done in a manner so as to not only comply with existing and proposed state and federal mining programs but ensure minimal environmental damages. The site evaluation will include the evaluation of the soil and rock properties, surface and ground water resources, physical and cultural features, and methods of mining and reclamation. It will consider the geological and hydrological setting prior to mining as the basic inputs to the pre-mining planning. The manual of practice will provide guidelines and means of assessing alternatives in the areas of water management, land use planning, and surface mine engineering, and will be mostly based on information gained from literature review and critical evaluation of methods as reported in the literature and applied in the field. The M.O.P. shall recommend methods, techniques and alternatives for selecting and designing mining systems to achieve soil handling and storage, and overburden handling, segregation and disposal. It will be presented in an orderly and concise manner. Liberal use of charts, maps, graphs, diagrams, and photographs will be made to substantiate the description.

The Manual of Practice (M.O.P.) will be designed to assist mine operators and control personnel in developing, evaluation and selecting mining and reclamation plans that will be least detrimental to the environment, prior to the commencement of mining.

R803889 01

In order to assure that subsurface disposal is conducted in the most effective and environmentally cognizant manner, an Engineering Guide is proposed to assist in standardizing construction, operation, maintenance and monitoring features of waste injection systems. The proposed Guide will encompass the entire spectrum of waste injection beginning with site evaluation through system design, operation and maintenance, monitoring, abandonment, and regulation. The Guide is to provide recommended standards for "in the field" use as well as a basis for state and federal regulations, if necessary. The Guide would be of particular importance to the U.S. Environmental Protection Agency in supporting its responsibilities under Public Law 92-500 and the Safe Drinking Water Act of 1974, Public Law 93-523.

The proposed Engineering Guide and accompanying report on abandoned wells will be designed to meet the following major needs:

(1) To serve as a field applications and design manual for waste injection systems, emphasizing all design and construction features relating to the potential pollution of the ground water resource.

(2) To serve as a comprehensive source of technical information on all aspects of waste injection systems, including an annotated bibliography of such technical information as case histories of existing installations, design considerations, etc.

(3) To serve as the first comprehensive report on current practices of well abandonment, their impact on water supplies, and the methodology necessary to correct the situation in the future.

S803892 01

The objective of the project is to determine the efficiency of the rotating biological contactor (RBC) system in treating effluent from a liquid detergent manufacturing plant. Efficiency will be compared to an extended aeration system now in operation and advantages and disadvantages of the experimental system identified.

A pilot unit will be operated with the same food as the existing plant and performance under various conditions will be determined. Variables to be evaluated include performance at optimum conditions compared to extended aeration, maximum loadings to the system, performance under variable loadings, performance at wastewater temperatures experienced both during the summer and winter.

The project is expected to be completed within twelve months of initiation.

R803893 01

The proposed research seeks to identify the chlorine-containing organic compounds that are formed when chlorine is added to seawater. Initial emphasis would be on reaction conditions that occur during power plant operations; i.e., up to 2 hours at temperatures up to 38C with and without sunlight. Chlorine-36 would be used so that reaction products could be assayed with liquid scintillation counting. Total organic chlorne compound yield would be measured. The reaction products would be fractionated, using selective solubility and thin layer chromatography. The fractions would be bioassayed with Acartia tonsa and the most toxic fractions taken for initial work. Characterization would be primarily with gas chromatographic-mass spectral techniques and additional characterization would be based on UV and IR spectra with NMR for special cases.

R803895 01

Small euhedral and framboidal forms of pyritic sulfur have been shown to be positively associated with acid mine drainage problems and, in turn, the reactive framboidal pyrite is found only with rock strata of a particular paleoenvironment. As a criterion for predicting the occurrence of acid mine drainage in advance of mining, the present study tested the hypothesis that the type of pyritic sulfur in the coal could be predicted by the depositional environment of the overlying strata.

The results to date are very encouraging; back barrier and lower delta plain samples have sulfur contents that range from 3-5% and every sample contains abundant framboidal pyrite. These strata will probably produce severe degrees of acid mine drainage. In the alluvial coals there appears to be a paucity of framboidal pyrite. However, an inadequate sampling design precludes a definite conclusion based on the absence of the reactive pyrite. In general, the results obtained thus far reflect some very promising trends in developing a technique that uses the paleoenvironment of a stratum to predict the quality of the drainage expect there from.

The present study will be expanded to incorporate an effort that will be directed toward the careful documentation of criteria which are necessary for the identification of acid producing coal and spoil through a field manual of core and rock photographs. A variety of samples that represent the "standard" rock types will be collected, analyzed, and appraised of the acid production potential of a stratum utilizing the pyrite morphology, total sulfur content and the permeability of the stratum. These data will be used to develop a technique that will identify strata which in some areas will produce acid mine drainage, locate strata in the highwall that should be segregated for burial or surface dressing, and that field techniques regarding overburden handling for the amelioration of problems or enhancement of reclamation efforts. With the field base thus established and samples collected we will proceed on a pilot project dealing with the role of depositional environments in determining the distribution of trace elements in coal.

R803896 01

The three main objectives of this study are: 1) establish and document by field measurements the sulfur budget in large single plumes, 2) identify the major physical and chemical mechanisms and parameters which govern the sulfur budget, 3) Formulate and test a dispersion-transformation-removal model for $SO_2$ and aerosol. Instrumented aircraft and surface vehicles will be used for the detailed plume mapping of fixed distances from the source outward to 100 km. Using wind field data from pilot balloon measurements, the horizontal sulfur flux will be measured in the gas and aerosol phase. The aerosol mass and sulfur content will be measured by a high resolution β-guage and vaporization-flame photometric method, respectively. These data will be utilized to establish the amounts of $SO_2$ converted to aerosol and its rate and the amount of sulfur removed by dry deposition. The data will be used for the improvements and extension of dispersion-transformation-removal models.

R803898 01

The proposed study will determine selectivities for nitrate removal at concentrations typically found in drinking water supplies where nitrate is a problem. Thermodynamic and kinetic data will be obtained for this system in both batch and column studies. Removal systems examined will include both a single strong-base resin and a combination strong-acid, weak-base system.

Regeneration of the resins will also be studied from the point of view of efficiency and the economics and environmental implications of disposal of regenerants.

R803899 01

Objectives of this investigation are:

1. To generate reliable year-round performance data for a well-designed combination aerated/facultative lagoon system located in North Gulfport, Mississippi.
2. To evaluate obtained data with respect to design criteria and the lagoon's ability to comply with the secondary treatment requirements of PL 92-500.
3. To utilize the collected data for defining possible design and operational upgrading techniques and future research needs.

One year of lagoon system performance data will be collected and evaluated with respect to the preceeding objectives. Flow-composite samples will be collected at the following locations: Lagoon influent, between cells in series, lagoon effluent, and after chlorination.

Sampling frequency will be 30 consecutive days, four times during the year and 7 consecutive days once a month during the other 8 months of the performance evaluation.

Measurements and analyses to be performed include wastewater flow, alkalinity, total and soluble $BOD_5$, total and soluble COD, suspended solids, volatile suspended solids, Kjeldahl nitrogen, ammonia nitrogen, nitrite nitrogen, nitrate nitrogen, total phosphorus, fecal coliform counts, and algae cell counts. Temperature, pH and dissolved oxygen measurements will be made in situ. Meteorological, maintenance, and electrical usage data will also be collected and evaluated.

R803900-01

The principal objective of this project is to generate reliable year-round performance data for a typical aerated lagoon system, operating on domestic wastewater, in the north Midwest. A second objective is to evaluate the effectiveness of this system in relation to its design criteria and to the secondary treatment standards of PL 92-500. The study may be compared with recent studies on facultative lagoons. Work will be conducted at the existing 3-cell "Air-Aqua" lagoon system at Pawnee, Illinois.

R803906 01

This research seeks to describe and analyze the Metropolitan Council (of the Minneapolis/St. Paul metropolitan area) as an area-wide environmental management organization.

Specifically, it proposes: a) to write an organizational history identifying the strategies chosen to address perceived environmental management problems; b) to describe the current operating system, identifying implementation instruments employed, linkages among instruments and ties between instruments and institutional structure; and c) to perform a limited number of specific studies analyzing the operation of the system.

R803908 01

The object of this study will be to define the problem associated with the clay slimes produced by the washing of sand and gravel, to determine if improved operation and reclamation of recirculation ponds is feasible, and to seek alternative means of disposal of clay slimes. Major tasks to be conducted are: (1) characterize the clay-slime dewatering problem, (2) investigate methods for more efficient utilization of slime storage ponds, (3) investigate methods for ultimate reclamation of storage ponds, (4) investigate mechanical/chemical alternatives to ponds, (5) investigate process modifications to minimize slime handling and (6) seek other treatment alternatives.

S803910 01

The objectives of this project are:

1) To convert a three pass diffused air system to a single pass open tank pure oxygen system.
2) To evaluate the performance of the pure oxygen system at varying food to microorganism ratios, detention times, ambient temperature, and diurnal flow conditions.
3) To determine design criteria for a full plant scale conversion of the existing secondary system to an open tank pure oxygen system, as they relate to oxygen utilization efficiency, solids settling characteristics, power requirements for oxygen dissolution, and reliability of oxygen diffusion and control equipment.
4) To demonstrate the feasibility of using this technology at other overloaded activated sludge plants that could benefit from upgrading of existing tankage and facilities.

Operation at Metro over the past four year of very fine bubble pure oxygen diffusion systems in open tank (up to 0.5 MGD) has demonstrated the potential of the oxygen system for upgrading the existing system at lower cost than other alternatives. The smaller scale pilot plants did not, however, have adequate clarifiers for obtaining data necessary to determine limiting conditions of the process. It is the intent of this project to provide for installation of 13 rotating active diffusers and oxygen monitoring and control equipment to evaluate system capacity over a wide range of conditions and for optimizing process results.

## R803911 01

The proposed study is intended to evaluate the performance of the newly installed extended aeration and aerobic pond systems for the treatment of salmon processing waste water. The systems will be examined at various operation conditions. The results will be analyzed to determine if the control efficiencies of the systems are adequate to meet the subject process waste effluent limitations (operational modifications will be made in order to improve systems performance when necessary). Meanwhile, treated water quality will be evaluated to determine its feasibility for salmonid propagation that is intended in the near future by the council in order to complete the turnkey operation - salmonid propagation and processing. This type of investment will improve employment opportunity and economy of the tribal community.

Both extended aeration and aerobic ponds systems constructed near the council's salmon processing plant in Shelton, Washington, provide the flexibilities for flow bypassing and adjustments. These flexibilities will allow the investigators to evaluate the systems at various conditions. The results will be reduced to useful forms. The engineering criteria will be derived/documented for future design application. These design criteria derived will be very useful and extremely important to fish processing waste control due to the lack of data available to date.

## R803913 01

The chlorinated insecticide toxaphene is being used to the extent of 55 million pounds per year and over one billion pounds have been used in the past 25 years. The proposed program is concerned with several areas related to toxaphene. One is to examine in detail the chemical and toxicological differences and similarities of toxaphene and toxaphene-like materials used throughout the world during the past 25 years. Others are concerned with isolation or synthesis of toxic components of the mixture and chemical and toxicological studies on these components. Finally, the biochemical mode-of-action of the individual components will be examined.

To carry out these studies, standard techniques including adsorption, partition and gas chromatography, spectroscopy (uv, ir, nmr, ms) and toxicological testing with both insects and mammals will be utilized.

## R803914 01

The objectives of this project are to study the metabolism of representative ethylene-bis-dithiocarbamate (EBDC) and dimethyldithiocarbamate fungicides in the rat. In addition, the effect of these compounds on the steroid hydroxylating enzymes in the liver, testes and adrenals will also be examined. Finally, the anti-thyroid properties of the EBDC fungicide metabolite ethylene thiuram monosulfide will also be examined. Radiolabeled ($^{35}S$ and $^{14}C$) compounds will be used and the metabolites identified using gas chromatograph and thin layer chromatography.

## R803915 01

The objectives of this project are to determine the concentration of polychlorobiphenyls (PCB) in the atmosphere and precipitation in Chicago and their distribution in the Lake Michigan basin. The washout coefficient for PCB by precipitation will be determined and this, along with the above information will permit the inputs of these materials in precipitation to Lake Michigan to be determined. The distribution of the PCB in the atmosphere between vapor and material adsorbed on aerosols will be determined. Information on other chlorinated hydrocarbons should also be determined.

## R803916 01

The generic objective of this research project and the thing that makes the research applicable on a national basis is that it becomes part of a larger study to identify the performance capabilities of well-designed and well-operated lagoons. The primary objective of this project is to generate reliable year round performance data for a typical multi-cell aerated lagoon waste disposal system. Bixby, Oklahoma is a case in point. This lagoon, which consists of two cells in series using an air aqua system, is located in the town of Bixby, Oklahoma, which is part of the Incog Multi-County Planning System. The secondary objective is to utilize these data to evaluate the effectiveness of the multi-system lagoon to perform in accordance with its design criteria and the ability of such a design criteria in performance to meet the secondary treatment standards as established by the Federal Water Pollution Control Act Amendments of 1972. This grant application proposes to generate and evaluate data from this lagoon system similar to data for other well-designed, well-operated multi-cell cerated or a combination aerated and foculative lagoon. These data will be used not only to assist design engineers and regulatory officials but should also assist EPA in its stated objective of defining lagoon capabilities and upgrading needs. A great number of parameters will be studied in considerable depth. Out of the parameter study alone should come two significantly useful things: 1) the more meaningful parameters conceivably could be used as routine operational tests, and 2) the parameters can be interrelated to provide predictive equations for future design.

## R803917 01

The objectives of the proposed program include:

1. Development of a quantitative procedure for the isolation of two organophosphorus pesticides-parathion and malathion-from sea water.
2. Identification of the important environmental parameters involved in the degradation of organophosphorus pesticides in sea water by following the loss from solution of the pesticides in a series of experiments.
3. Identification of the degradation products formed.
4. Calculation of applicable rate constants for parent pesticide loss and degradation product buildup.

The approach will be to do a series of experiments under conditions commonly found in the marine environment where one parameter at a time is varied. The effect of this on the rate of degradation will be established. Through the series the important environmental parameters will be identified. The pesticides and degradation products will be removed from sea water by solvent extraction and/or adsorption onto resins and analyzed by gas-liquid chromatography. (Both qualitative and quantative analysis of the products will be carried out.)

The final step will be the calculation of degradation rates and buildup rates for the various chemical species identified.

## R803918 01

1. Objectives: To determine by epidemiologic and supportive laboratory studies the health effects of consuming barium in Illinois drinking water exceeding wthe recommended drinking water standard of 1.0 mg/liter. Particular emphasis will be given to see if barium consumption is associated with cardiovascular and renal disease and the prevalence of hypertension. 2. Approach: (a) Mortality rates will be retrospectively examined for statistical differences between deaths attributed to cardiovascular diseases in communities in Illinois with elevated barium levels in their drinking water supplies and the National and State averages. Diseases examined will include hypertension, ischemic heart disease, peripheral vascular disease, cerebrovascular disease and renal disease. (b) A household morbidity study will be performed on an exposed population. Morbidity rates will be compared with the National and State averages. The exposed population will be subjected to blood pressure measurements and a questionnaire Tap water samples from households will be analyzed for trace metal composition. 3. Progress: We have identified those Illinois communities above the standard of 1.0 mg/liter We have acquired Illinois State Death Certificate Tapes from which mortality rates will be examined. We have made initial contact with the communities involved in the morbidity study.

R803922 01

A study of the chemical and biological effects of chronic low-level petroleum input to the intertidal environment by oil seeps will be conducted. Chemical measurements of the kinds and amounts of hydrocarbons in water, sediment, and selected biota of seep and control areas will be made. Biological measurements of the fitness of selected species and communities in oiled and unoiled sites will also be made. Biological measurements will focus on phytoplankton because of their key position in food webs and on sessile benthic infauna and epifauna because of their exposure for multi-year periods. During the summer of 1975 preliminary fieldwork will be carried out at two candidate study areas on the coast of the Gulf of Alaska to determine their suitability for this work. Control sites for each seep area will also be sought. Based on the results of the first year's work, a single site and control will be selected for further more intense study during the following two years.

S803927 01

Purpose of the project is to evaluate the operational worth and environmental aspects, if any, of adding combustible solid matter to wastewater plant sludges and filter cakes, as off-sets to part or all of the fuels conventionally used in sludge incineration practice. Impending shortages of natural gas and fuel oil create the sense of urgency in this work. Low-sulfur coal and combustible solid wastes will be utilized as admix materials in various test sequences. Wastes to be tried include shredded combustibles from refuse, in pelletized and loose form, wood chips from urban tree-trimming, shredded tires, and industrial combustible wastes. A full-scale multiple hearth furnace in a modern wastewater treatment plant will be used. Applicability to other incinerators of the 200-plus total in United States' communities will be assessed. Assay of stack gases, after scrubbing, will include relevant chemical properties of public health significance. Scrubber drainage and ash will also be assayed.

## R803930 01

A) The objective of the project are:

  1. To obtain performance data for a 12 month period of a well-designed, well-operated multicell aerated lagoon treating municipal waste water.
  2. To utilize the collected data for the evaluation of the reliability and effectiveness of the Koshkonong aerated lagoon system to perform according to design criteria, as well as to evaluate its ability to meet secondary treatment standards corresponding to the Federal Water Pollution Control Act Amendments of 1972.

B) Data will be collected on the operation and performance of a three cell series flow aerated lagoon system treating municipal wastewater as follows:

  1. Monitor the system influent and effluent daily flow variations with recorded maximum, average, and minimum flows.
  2. Monitor water quality parameters at five locations, influent, intermediate points between cells 1 and 2, cells 2 and 3, lagoon effluent and chlorinated effluents. Sampling frequency will be selected to reflect performance consistent with determining relationship to secondary treatment effluent guidelines proposed by EPA for 1977. Water quality parameters such as water temperature, pH, DO, TSS, VSS, alkalinity, $BOD_5$ total and soluble, COD total and soluble, TKN, ammonia, nitrite, nitrate and phosphate will be determined. In addition, fecal coliform and algae counts will be made.

The results will be evaluated in terms of effluent guideline compliance and recommended design criteria for aerated lagoon systems subject to large seasonal variations.

## S803931 01

The objective of the proposed study is to investigate the performance of a modified land treatment system for upgrading wastewater effluents. Specifically, it is proposed to evaluate a high-rate infiltration percolation system for improving the effluent from the 75th Street Wastewater Treatment Plant in Boulder, Colorado. In general, this will involve varying the wastewater loading conditions onto the infiltration percolation system and assessing the impact of these variations on the quality of the effluent collected at the base of the bed.

The system will be located on 4 acres of sandy-clayey soil with an infiltration depth of 8-12 feet. The loading rates are anticipated to range from 25-150 ft./year. Specific parameters of interest are temperature, nitrogen loading, and organic loading. Seasonal operational problems will also be determined and assessed.

Construction is anticipated to begin by mid-July 1975 and be complete by 1 September 1975. The project will operate until July 1978.

R803936 01

The objectives of this research are to determine the kinetics of phosphorus neralization in soils under oxidizing conditions and to relate these findings to the movement of phosphorus in soils. Movement of phosphorus in soils becomes important when large quantities of phosphorus are added to soils.

The objectives will be accomplished by the following techniques:

1. Determination of phosphate potentials at time intervals on soils to which phosphorus has been added. Phosphate potentials will be used to identify the phosphorus compounds present and the changes with time.
2. Identification of phosphorus compounds present in saturation extracts from soils equilibrated with saturated solutions of phosphorus compounds. Changes in the phosphorus compounds with time will be determined.
3. Identification of phosphorus compounds formed at the surface of soils in plexiglass reactions cylinders.

R803937 01

Resulting from new and developing environmental legislation, the mining and shipment of low-sulfur coal products has shifted significantly from the bituminous fields of the Appalachian belt to the sub-bituminous and lignite fields of Wyoming and Montana. Thus, much coal will soon be under shipment to the industrial and populative midwest from the west. New storage and transshipment facilities are anticipated throughout this area. One of the first of these new facilities is being constructed on the water front of the Superior-Duluth Harbor.

The short, intermediate and long-term effects of such coal storage (awaiting lake transshipment) on the local aquatic environment has not been fully documented. Under this EPA sponsored research study, particular and related chemical and biologic relationships for any such facilities (at least fifteen are presently planned in the midwest) will be studied. During the initial year the following research approaches will be utilized

1) The operation of coal leachate columns to determine factors which mobilize heavy metals from the coal matrix and their release to the aquatic environment.
2) The uptake and retention of heavy metals by the local harbor benthic population.
3) A similar study as 2 but relating to vascular macrophytes.

Information and corrective documentation will be useful in any area where the storage of such newly-utilized energy related material takes place in proximity to an aquatic environment.

## R803943 01

The proposed project deals with the effects and fate of certain widely used pesticides in marine phytoplankton. The specific objectives of the investigation are as follows: (1) To study the effects of methyl parathion, pentachloronitrobenzene, captan, carbofuran and some of their known metabolites on the growth of selected species of marine phytoplankton, (2) To study the effect of the pesticides on some basic biochemical processes of the test organisms, (3) To study the effect of the pesticides in the presence of other environmental pollutants such as heavy metals and, (4) To study the uptake and metabolism of the pesticides by marine phytoplankton and to identify the metabolites.

Radio-labeled pesticides will be used to study their uptake and biotransformation by the phytoplankton. The metabolism of the pesticide will be investigated by analyzing the cell extract and the incubation medium for the pesticides and their metabolites using paper-, thin-layer- or gas-chromatography. The identity of purified metabolites will be confirmed by infrared and mass spectrometry.

## R803945 01

The effects of a buried pipeline stream crossing will be monitored in the Salcha River near Fairbanks to determine the environmental effects of bottom disturbance. Parameters to be considered will be 1) Type and rate of flow. 2) Oxygen and carbon dioxide content of water. 3) Water temperature. 4) Size, type and distribution of particles forming stream bottom. 5) Intra-gravel water flow and chemistry. 6) Quantity and diversity of animal and plant organisms. 7) Organic drift. 8) Primary productivity. Factors wil be monitored pre- and post-construction to determine what differences, if any, have been produced by disturbance.

## R803948 01

A group of plant physiologists, agricultural chemists, and soil scientists at Oregon State University is investigating effects of various non-gaseous airborne pollutants emanating from coal-fired power plants on plant growth and metabolism. The overall objectives of the initial two-year project are to: (a) identify physiological and biochemical processes in plants which can serve as specific indicators or predictors of stress or damage induced by heavy metal and other toxicants emanating from the stacks of coal-fired power plants; (b) elucidate effects of heavy metal toxicants on specific key physiological and biochemical processes in plants, such as photosynthesis, biological nitrogen fixation, and energy conservation processes coupled to respiration; and (c) describe parameters for assessing and predicting damage to natural vegetation, crops, wildlife, domestic animals, and whole ecosystems by heavy metal toxicants. Initial investigations — in plant physiology-biochemistry and soil science -- will be conducted with selected species of bacteria, algae and seed plants, including but not limited to some species indigenous to the Colstrip area of Fort Union Basin area of southeastern Montana, where the EPA has an ongoing long-term, broad-scope project.

The overall objective of this investigation is to provide predictive information with regard to potential toxicants to the aquatic environment resulting from coal and oil shale extraction and conversion. The specific objectives are to identify and quantify those chemical products of coal and oil shale extraction and conversion which may reach surface waters, and to determine by both field studies and laboratory bioassays the degree to which those chemicals may be acutely or chronically toxic to fish and aquatic invertebrates, or may become involved as part of the food chain. Four categories of energy development will be considered: coal extraction, oil shale extraction and processing, coal gasification, and coal-to-energy conversion. Potential toxicants to the aquatic environment will be identified by a combination of field, laboratory, and literature studies, as well as by information gained from cooperative input from other energy-related research programs. Concurrent chemical and biological laboratory and field bioassays as well as aquatic distribution studies will dictate which toxicants are most deleterious to the aquatic biota. Feedback from these bioassays and distribution studies will dictate what additional or alternate emphasis is required in the laboratory and field chemical studies.

## R803952 01

The data accumulated in this project will fall into several catagories. Foremost will be the attainment of analytical profiles of organics in coal leachates and quantitative data on metal contents. Reliable acute-toxicity data (no animals) as well as an evaluation of potential carcinogenic effects, must be determined for these samples. A careful integration and interpretation of this data, along with the albedo measurements and effect of particulate matter from coal dust sources, will be necessary if the results from the project are to have a meaningful application to the aqueous environmental problems, i.e., those possibly associated with extensive and long term coal dock facilities.

This project will be related to our broader interests and investigations in the area of aqueous chlorinations and aquèous ozonations of organic pollutants. It seems reasonable to evaluate the effect of chlorination (possible production of refractory carbon bound chlorine species) and ozonation on those toxicity parameters that will be used for ascertaining potential hazards associated with the organic content of coal leachates.

## R803959 01

The objective of the proposed research is to determine the quantity, nature and persistence of chlorine residuals in cooling waters from coastal power plants that have been treated with chlorine for slime control. Cooling water intake, in plant cooling water and cooling water discharges will be sampled during chlorine treatment for gross chlorine residual determination at several sites. At a limited number of sites an attempt will be made by extraction, concentration gas chromatography and mass spectrometry to quantitate and identify important components of the chlorine residual. The persistence of important components of the chlorine residual under conditions representative of the discharge will be examined in the laboratory.

803902.01

1. The objective is to construct a conveyor system that will transport refuse derived fuel pellets to a cement plant. This will permit setting-up of testing program to evaluate the effectiveness of the fuel pellets as fuel and the environmental impact of the use of refuse fuel pellets as fuel.

2. The approach is to utilize an existing producing cement plant together with their monitoring system to evaluate the use of pellet fuel.

3. Preliminary testing has been completed utilizing temporary and improvised equipment layout together with limited amounts of pellet fuel.

R803975 01

The objective of this work is to make a detailed chemical and biological evaluation of the aerated lagoon system presently operated by the Windber Area Water Authority of Windber, Pennsylvania. The three-cell Hinde Aqua Lagoon unit will be sampled at five points within the system. The samples will be collected at the (a) lagoon influent (b) between lagoon cells in series (c) lagoon effluent (Unchlorinated) and (d) after effluent chlorination. The samples will undergo extensive chemical analysis as well as fecal coliform counts and algae cell counts. Variables such as weather, waste water temperature, daily flow entering and leaving the lagoon, and electrical requirement for operation of the plant will also be recorded. The study will be 12 months with one 30 day period in each season of continuous sampling. The results will be evaluated by E.P.A. to aid in future lagoon design, etc.

## S803976 01

Objectives:

1. To investigate the use of liquid sludge in seedling establishment of turf.
2. To determine the feasibility of replacing fertilizer with liquid sludge in the production of sod.

Reasons for Undertaking Work: The turf industry is continually faced with the problem of re-establishing grass after the sod is removed and sold. Grass seed is small, easily removed by erosion and subject to severe drought because seedlings must be made on the surface of the ground. The cost of seed and timeliness of seeding dates limits the number of reseedings that the sod grower can attempt. Mulches from straw and other materials aid greatly in seedling establishment but are too costly for use by commercial sod producers. Thus, liquid sludge would have considerable economic value if it could improve the seedling establishment.

Fertilizer costs have increased drastically during the past two years. Talk of limiting fertilizer use to food crops threatens the entire sod industry. If sludge can replace most of the fertilizer needed for sod production, it should achieve ready acceptance by the industry.

## R803977 01

The proposed investigation is intended to separate, identify and quantitate polynuclear aromatic hydrocarbons (PAH) in selected natural and treated waters of the United States. The problem will be divided into three segments: The first segment will be devoted to developing a rapid and efficient method for removal of trace quantities of PAH from natural waters. Two types of collection devices will be examined: (I) flexible polyurethane foam, (II) continuous liquid-liquid extraction based on mixed settling. The second segment will be devoted to local field testing of the methodology and determination of PAH in drinking water, river and lake waters, and ground water of the eastern United States. The third segment will be devoted to analysis of EPA supplied drinking water samples collected from the major cities in the U.S. The purification of PAH will be achieved by chromatography on alumina and/or florisil. The eluate from column chromatographic separation would be analyzed by gas and/or thin-layer chromatography. Alternatively, PAH will be separated by high speed liquid chromatography with ultraviolet photometric detector. The identification of isolated material will be based on their TLC Rf values, their g.c. retention times or volumes, and ultraviolet and fluorescence spectra. Mass spectrometry will be used to provide final evidence of their identity. The quantity of the identified PAH will be estimated from gas chromatographic peaks or u.v. absorption peaks.

## R803979 01

Assistance is requested for the running of the International Conference on Heavy Metals in the Environment to be held in Toronto, Canada from October 27-31, 1975. The conference is designed to be a high quality scientific meeting involving academic, government, and industry scientists working in the many areas of heavy metal concern. The four subject areas are 1) analytical techniques and standard setting, 2) pathways and cycling of heavy metals in natural and man-made ecosystems, 3) human health, including toxicity, sub-lethal effects, epidemiology, and 4) regulatory problems. A joint USA-Canadian committee is organizing the conference. Approximately 55 eminent scientists have been invited to present papers or to take part in panel discussions. In addition, 200 abstracts have been received to date for contributed papers. An attendance of 1000 is expected. The objective is to create ah atmosphere for interdisciplinary exchange and a forum for up to date presentation and discussion of the state of the art. Through this, it is hoped that more rational strategies can be developed for control of heavy metal problems, especially in the area of standard setting. It is also hoped to focus on important present problems,probable future concerns and palliative approaches. The international flavour of the conference should ensure it usefulness - present indications are for scientists from more than 30 nations to attend. WHO is to assist in further publicity in Latin America. A symposium volume will be produced by spring 1976.

## R803984 01

The proposed work will continue to be carried out in collaboration with the Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma, and the Southeastern Regional Laboratory, Environmental Protection Agency, Athens, Georgia, in an effort to determine the nature and composition of petroleum derived organics in refinery wastewater and their modification by a treatment system prior to discharge into the environment. The Mass Spectrometry Unit, Space Sciences Laboratory, University of California, Berkeley, will work closely with Southeastern Regional Laboratory in devising a "clean," effective separation scheme for compound classes by high resolution mass spectrometric analysis of steps in the separation scheme. This laboratory will subsequently carry out high resolution mass spectrometry and $^{13}C$ nuclear magnetic resonance analysis of the fractions provided by SERL. Gas chromatograph-high resolution mass spectrometry will also be used in these studies. Capillary gas chromatography-low resolution mass spectrometry studies will be correlated with results from high resolution mass spectrometry. It is expected that the following information on refinery wastewater will result from this interlaboratory cooperative study: 1) determination of what organics are discharged after typical refinery treatment; 2) determination of where in the refining and treatment processes these organics originate; 3) a knowledge of what happens chemically and biologically to organics during different treatments.

R803965 01

The National Farmworker Information Clearinghouse will conduct a series of pesticide use surveys by administering EPA-designed questionnaires to farmworker program staff nationwide, and will simultaneously analyze farmworkers' reports of pesticide abuse made directly to the Clearinghouse in order to research farmworker-related pesticide problems and to measure the effectiveness of the pesticide enforcement program in regulating pesticide use.

S803991 0100

The overall objectives of the Arthur Kill-20 project are, assuming feasibility, to convert the burnables in raw refuse into 850 tons per day of satisfactory boiler fuel to replace expensive imported fuel oil, and at the same time, to increase the recycling of non-burnables. This project could replace about 1400 barrels of oil daily, or about 1% of the needs of Con Edison, the local utility.

The normal City of New York approach consisting of four steps leading to construction of a facility will be employed. They are: feasibility study, preliminary plan, final design and construction. The City has entered into a contract with Con Edison and two consulting engineers for the first two steps in this process. The chief output of Phase II will be a set of preliminary drawings, outline specifications and cost estimates based on the recommended arrangement (elected at the conclusion of Phase I) of the handling facilities. This includes the processing of raw refuse from dockside at Staten Island, shredding, separating and processing the light and heavy fraction for sale or further processing. Other items to be investigated in the phase include ownership, financing and working arrangements between the City and Con Edison.

Currently, work is proceeding on Phase I, which is the Feasibility Study. The consultants are investigating among other items, unloading and processing locations and layouts, transporatation of the refuse fuel, modifications to the boiler, initial capital cost estimates and environmental assessments.

R804008 02

The objective of this project continuation is to develop the technologies in the utilization of solid waste as a fuel in combination with coal so as to provide guidance for energy recovery from solid waste in such a manner as to reduce the environmental impact of solid waste disposal and the emissions from coal-fired power plants.

The approach is to evaluate gaseous and particulate emissions, plus corrosiveness of the combustion products as a function of solid waste to coal ratio, and as a function of sulfur content of the coal. Also, refuse processing variables and methods of feeding refuse into the furnace will be evaluated. This various experimental paramenters will be explored in an operating power station through the cooperation of the City of Columbus, Ohio.

During the first year, research methods were explored for feeding semi- and fully processed solid waste into the Columbus, Ohio, municipal light plant boiler furnaces using commercially available agriculture-type conveyors and blowers. Boiler tube corrosion data obtained when 15 and 35 percent refuse (Btu basis) was added to 3 percent sulfur coal, show no increase in corrosion rates at the 15 percent refuse level. Also, stack emission studies indicate a significant reduction in sulfur oxide emission when refuse is burned with high sulfur coal. Furthermore, examination of the ash revealed no unburned solid waste. It is planned to expand the program to longer term operations to permit confirmation of the above results and to determine the relative merits of higher refuse to coal ratios in terms of corrosiveness of combustion products, emission characteristics and combustion behavior. It is planned to replace the temporary refuse handling system with more rugged equipment for long-term operations.

## R804016 01

We propose to interface laboratory submodels describing pesticide volatility and degradation to field pesticide attenuation data. The submodels and data will be supplied by SERL and the work will serve as an input to the pesticide and Nutrient Runoff Models currently being developed by SERL.

The digital computer program (compiler) MLAB, developed by Gary Knotts at NIH, shall be used as an integral tool for testing models. Each model will be tested against field data in order to establish the feasibility of employing in the model the parameters calibrated with laboratory data.

In the initial model, it is assumed that microbial degradation obeys a hyperbolic rate equation and that attenuation processes other than microbial are independent and additive. Moisture, rainfall and temperature dependences are incorporated.

R804029 01

The investigation of cyanide removal from refinery wastewater utilizing cupric chloride and powdered activated carbon is a two phase program. Phase I consists of laboratory tests using a synthetic cyanide waste to determine the basic chemistry of cyanide destruction. Operating parameters, such as concentration of carbon and cupric chloride, dissolved oxygen levels, and pH level, will be determined.

Phase II will involve the use of actual refinery wastewater streams that contain cyanide. The effect of the other pollutants present on the cyanide destruction will be investigated to determine the overall feasibility of this treatment technique.

S804064 01

Objectives are to draft and assist in passage of appropriate enabling legislation, establish an operating agency, formalize fuel/energy and material agreements, secure waste supply agreements, prepare preliminary engineering, prepare an environmental assessment, issue and evaluate a Request for Proposals, and market revenue bonds. The approach is to finalize essential elements leading to implementation of a system to recover energy and recyclable materials from solid waste. The Project is expected to begin in August 1975 and conclude in July 1976.

R804152 01

This project is an investigation of the potential effects of an oil spill on a large arctic lake. The principal effort of the proposed research will be to carry out an experimental spill and to observe the impact and recovery. Initially a pre-spill baseline study will be done on the proposed site. Controlled small-scale laboratory and field experiments also will be carried out on specific organisms or processes as part of the initial work. Emphasis will be on the analysis of ecosystem function in order to broaden the applicability of these results to other high latitude aquatic environments.

The program is to be coordinated closely with energy-related impact studies sponsored by ERDA and with basic aquatic studies sponsored by the NSF Office of Polar Programs.

S804157 01

Low, moderate, and high loading rates of sludge and of refuse, each separately, and both together, will be incorporated into the topsoil of 36 separate plots, of 0.13 acre each, during summer 1975. Crops will be seeded into those plots. Crops used will be a single variety of grass and a single variety of legume known to be favored by local farmers; these will be planted in three modes: each separately and both together (interplanted).

The trial will assess the effects of various loading rates of sludge and of refuse on the environment and on the crop, when these are incorporated into agricultural topsoil. These effects will be evaluated by laboratory analyses of samples of crops, soil, and water taken from each of the plots. The analyses will investigate crop yield and quality, soil water-holding capacity, concentration of any toxic metals that may be detected, and search for bacterial and viral pathogen persistance.

U.S. GOVERNMENT PRINTING OFFICE: 1975—210-810:42